96TH CONGRESS : : : : 1ST SESSION

JANUARY 15, 1979–JANUARY 3, 1980

HOUSE DOCUMENTS

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96th Congress, 1st Session - - - - - - - - - House Document No. 96–145

SUPPLEMENTAL APPROPRIATIONS AND BUDGET AMENDMENTS

COMMUNICATION

FROM

THE PRESIDENT OF THE UNITED STATES

TRANSMITTING

PROPOSED SUPPLEMENTAL APPROPRIATIONS FOR FISCAL YEAR 1979 AND BUDGET AMENDMENTS FOR FISCAL YEAR 1980

JUNE 8, 1979.—Referred to the Committee on Appropriations and ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1979

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THE WHITE HOUSE
WASHINGTON

June 8, 1979

The Speaker of

the House of Representatives

Sir:

I ask the Congress to consider proposed supplemental appropriations for the fiscal year 1979 in the amount of $810,219,000 and amendments to the requests for appropriations for the fiscal year 1980 in the amount of $117,166,000.

The details of these proposals are set forth in the enclosed letter from the Director of the Office of Management and Budget. I concur with his comments and observations.

Respectfully,

Jimmy Carter

Enclosures

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EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

June 8, 1979

The President

The White House

Sir:

I have the honor to submit for your consideration requests for supplemental appropriations for the fiscal year 1979 in the amount of $810,219,000 and amendments to the requests for appropriations for the fiscal year 1980 in the amount of $117,166,000. The details of these requests are contained in the enclosure to this letter.

I have carefully reviewed the proposals contained in this document and am satisfied that these requests are necessary at this time. I recommend, therefore, that these proposals be transmitted to the Congress.

Respectfully,

Jim McIntyre

James T. McIntyre, Jr.
Director

Enclosures

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EXECUTIVE OFFICE OF THE PRESIDENT

OFFICE OF THE SPECIAL REPRESENTATIVE FOR TRADE NEGOTIATIONS

1980 budget appendix page	Heading	1980 request pending	1980 proposed amendment	1980 revised request
74	Salaries and Expenses	$4,173,000	$100,000	$4,273,000

The proposed budget amendment would provide funds to pay the expenses of the U.S. representative to the Textile Surveillance Board in Geneva. This Board oversees implementation of the Multifiber Arrangement. This proposal would increase 1980 outlays by $100 thousand.

DEPARTMENT OF AGRICULTURE

FOREST SERVICE

1980 budget appendix page	Heading	1980 budget request	1980 proposed amendment	1980 revised request
205	Forest management, protection and utilization (In the appropriation language under the above heading delete "$104,664,000" and insert in lieu thereof $105,064,000; delete "$36,188,000" and insert in lieu thereof $37,938,000; delete "$748,578,000" and insert in lieu thereof $752,137,000; and delete "$152,821,000" and insert in lieu thereof $154,239,000.)	$889,430,000	$5,709,000	$895,139,000
208	Construction and land acquisition	335,547,000	1,891,000	337,438.000

The proposed budget amendments would provide funds to implement the Boundary Waters Canoe Area Act of 1978. This Act requires that a number of activities be undertaken by the Forest Service to lessen the economic impact on the Boundary Waters Canoe area of adding to the size of the wilderness and restricting uses previously allowed within the wilderness area. This proposal would increase 1980 outlays by $5.3 million.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

1980 budget appendix page	Heading	1980 request pending	1980 proposed amendment	1980 revised request
423	Alcohol, Drug Abuse, and Mental Health (In the appropriation language under the above heading insert the Indian Health Care Improvement Act with respect to mental health services, immediately following "et seq.),".)	$916,510,000	$99,100,000	$1,015,610,000

This proposed budget amendment would provide additional funds for initiatives in mental health. These funds will be used to maintain the momentum necessary to carry out the important recommendations of the President's Commission on Mental Health and to avoid a reduction from the 1979 level in the number of projects funded. This proposal was included in the 1980 budget as an item to be transmitted to the Congress separately so 1980 outlay estimates will not be affected.

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Management of Lands and Resources

For an additional amount for "Management of lands and resources", $11,000,000, to remain available through September 30, 1980.

This request would provide funds for a redirected environmental studies program for the Outer Continental Shelf oil and gas leasing program. This proposal would increase outlays by $3 million in 1979 and $8 million in 1980.

DEPARTMENT OF JUSTICE

GENERAL ADMINISTRATION

Salaries and Expenses

For an additional amount for "Salaries and expenses", $490,000, to be derived by transfer from "Support of United States prisoners".

This request for a supplemental appropriation would provide for establishment of an Office of Small and Disadvantaged Business Utilization as required by the Small Business Act of 1958, as amended. It would also provide for implementation of the recommendations of the President's Reorganization Project to improve the coordination of the Federal legal community. This proposal would have no effect on 1979 outlay estimates.

DEPARTMENT OF JUSTICE

GENERAL ADMINISTRATION

1980 budget appendix page	Heading	1980 request pending	1980 proposed amendment	1980 revised request
615	Salaries and expenses	$25,917,000	$2,251,000	$28,168,000

This request would provide funds for the Office of Small and Disadvantaged Business Utilization, and permit the implementation of the President's Reorganization Project's recommendations on the coordination of the Federal legal community. It would also create an Office of Intelligence Activities to coordinate the Department's intelligence policies. This proposal would increase 1980 outlays by $2.3 million.

DEPARTMENT OF JUSTICE

LEGAL ACTIVITIES

Salaries and expenses, General Legal Activities

For an additional amount for "Salaries and expenses, General Legal Activities", $974,000, to be derived by transfer from "Support of United States prisoners".

This proposed supplemental appropriation would provide funding for the Special Counsel in the Criminal Division to conduct an inquiry into the National Bank of Georgia and the Carter Warehouse. It would also provide for payment of private counsel fees where the Department of Justice cannot defend Government employees because of conflicts of interest. This proposal would have no effect on 1979 outlay estimates.

DEPARTMENT OF JUSTICE

LEGAL ACTIVITIES

1980 budget appendix page	Heading	1980 request pending	1980 proposed amendment	1980 revised request
618	Salaries and expenses, General legal activities	$98,119,000	$3,435,000	$101,554,000

This request would (1) enable the Special Counsel in the Criminal Division to continue to investigate the National Bank of Georgia and the Carter Warehouse, (2) fund the establishment, also in the Criminal Division, of an Office of Special Investigations to prosecute Nazi war criminals, (3) provide for increased litigation by the Civil Division of Department of Energy regulatory issues, and (4) transfer $115 thousand from the Office of Legal Counsel to the General Administration appropriation to provide for the establishment of an Office of Intelligence Activities. This proposal would increase 1980 outlays by $3.3 million.

DEPARTMENT OF JUSTICE

LEGAL ACTIVITIES

1980 budget appendix page	Heading	1980 request pending	1980 proposed amendment	1980 revised request
620	Salaries and expenses, United States Attorneys and Marshals	$230,980,000	$941,000	$231,921,000

This proposed budget amendment would provide additional resources to permit the U.S. Marshals Service to increase the number of witnesses accepted under the witness security program. This program supports the Government's prosecution of high priority organized crime and narcotics cases by protecting witnesses who fear retribution for their testimony. This proposal would increase 1980 outlays by $900 thousand.

DEPARTMENT OF JUSTICE

LEGAL ACTIVITIES

1980 budget appendix page	Heading	1980 request pending	1980 proposed amendment	1980 revised request
622	Support of U.S. prisoners	$25,100,000	-$3,300,000	$21,800,000

This proposed budget amendment reduces the request for 1980 appropriations for support of United States prisoners as a result of fewer prisoners being detained before trial due to the Speedy Trial Act, more efficient transportation of sentenced prisoners to prisons, fewer criminal cases being brought to trial, and fewer inmates in Federal prisons. This proposal would reduce 1980 outlays by $3.2 million.

DEPARTMENT OF JUSTICE

FEDERAL BUREAU OF INVESTIGATION

Salaries and Expenses

For an additional amount for "Salaries and expenses", $2,636,000, to be derived by transfer from "Salaries and expenses, Bureau of Prisons".

This proposed supplemental appropriation would transfer funds from the Bureau of Prisons to the FBI for the procurement of an airborne surveillance system. The system would provide an essential capability, currently not available to the FBI, for investigative purposes. This capability will result in increased agent productivity in the long term. This proposal would have no effect on 1979 outlay estimates.

DEPARTMENT OF JUSTICE

IMMIGRATION AND NATURALIZATION SERVICE

Salaries and Expenses

> For an additional amount for "Salaries and expenses", $3,935,000, to be derived by transfer from "Salaries and expenses, Bureau of Prisons".

This proposed supplemental appropriation would provide funds to renovate the former Border Patrol Academy at Port Isabel, Texas, so that the facility can be used as a detention center. It would also provide funds for keypunching of non-immigrant arrival and departure records. The rate of renovation of the detention center will result in decreased outlays in 1979 of $2.6 million and increased outlays in 1980 of $2.6 million in comparison to spending for salaries and expenses.

DEPARTMENT OF JUSTICE

IMMIGRATION AND NATURALIZATION SERVICE

1980 budget appendix page	Heading	1980 budget request pending	1980 proposed amendment	1980 revised request
626	Salaries and expenses	$300,715,000	$3,639,000	$304,354,000

This proposed amendment would provide an additional $1,500,000 to maintain non-immigrant arrival and departure records and modernize the Non-immigrant Document Control System, and $3,139,000 to automate the processing and records systems in twenty-three district, regional, and field offices. It would provide for the transfer of $1,000,000 and seventeen employees from the Immigration and Naturalization Service to the Office of Special Investigations, Criminal Division, to investigate and litigate pending Nazi war criminal cases. This proposal would increase 1980 outlays by $3,610,000.

DEPARTMENT OF JUSTICE

FEDERAL PRISON SYSTEM

1980 budget appendix page	Heading	1980 request pending	1980 proposed amendment	1980 revised request
630	Salaries and expenses, Bureau of Prisons	$328,167,000	-$6,667,000	$321,500,000

This proposed budget amendment reduces the resources available for salaries and expenses of the Bureau of Prisons as a result of a reduced prisoner population. This proposal would decrease 1980 outlays by $6.5 million.

DEPARTMENT OF LABOR

EMPLOYMENT AND TRAINING ADMINISTRATION

Advances to the Unemployment Trust Fund and Other Funds

For an additional amount for "Advances to the unemployment trust fund and other funds", $500,000,000, to remain available until September 30, 1980.

The additional amount is needed to make nonrepayable advances to the Federal unemployment benefits and allowances account for the payment of mandatory benefits for State and local government employees under Part II of the Unemployment Compensation Amendments of 1976 and Title II, Part B, of the Emergency Jobs and Unemployment Assistance Act of 1974, as amended. It is also needed to make repayable advances to the Black Lung Trust Fund, since revenues to that fund will be insufficient to make the benefit and interest payments required by law. The net payments for which this supplemental is needed will result in increased 1979 outlays of $100 million.

DEPARTMENT OF LABOR

EMPLOYMENT STANDARDS ADMINISTRATION

Black Lung Disability Trust Fund

For an additional amount for payments from the "Black Lung Disability Trust Fund", $300,000,000, for payments of benefits and interest on advances.

The reexamination of previously denied claims, required by the Black Lung Benefits Act of 1977, has proceeded faster than expected. A larger proportion of these claims has been approved than previously anticipated and the average size of the retroactive payment has been higher. The additional amount is needed to permit the payment of claims as they are approved. The additional payments will increase 1979 outlays by $300 million.

DEPARTMENT OF THE TREASURY
BUREAU OF THE MINT

1980 budget appendix page	Heading	1979 supplemental request pending	1979 proposed amendment	1979 revised request
1112	Salaries and expenses	$2,381,000	-$781,000	$1,600,000

1980 budget appendix page	Heading	1980 request pending	1980 proposed amendment	1980 revised request
765	Salaries and expenses	$50,580,000	$10,067,000	$60,647,000

These amended budget requests would cancel a request for a 1979 supplemental appropriation to mint the Susan B. Anthony one dollar coin and provide $1.6 million in 1979 and $10.1 million in 1980 to mint and provide distribution for 1.5 million gold medallions. These medallions would be sold to the public as provided by the American Arts Gold Medallion Act of 1978. The Susan B. Anthony one dollar coin would be minted with funds which have been reprogrammed from other areas. This proposal would decrease 1979 outlays by $2.2 million and increase 1980 outlays by $11.5 million. These outlays will be offset by receipts as the gold medallions are sold to the public.

OTHER INDEPENDENT AGENCIES

FEDERAL COMMUNICATIONS COMMISSION

1980 budget appendix page	Heading	1980 request pending	1980 proposed amendment	1980 revised request
890	Salaries and expenses (In the appropriation languauge under the above heading delete the colon after "$71,816,000" and insert in lieu thereof the following:) and, in addition, an amount equivalent to funds deposited into the General Fund of the Treasury by the State of Florida as a result of the expense of construction and relocation of the Fort Lauderdale Monitoring Station:	$71,816,000	Language	$71,816,000

This appropriation language would enable the Commission to allow the relocation of the Fort Lauderdale Florida Monitoring Station to permit the widening of Florida State Road 84. The State of Florida will assume all costs of the relocation. This proposal would not increase outlays.

96th Congress, 1st Session - **House Document No. 96-146**

DES MOINES RIVER BASIN, IOWA AND MINNESOTA

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY
(CIVIL WORKS)

TRANSMITTING

A CORPS OF ENGINEERS REPORT ON THE DES MOINES RIVER BASIN, IOWA AND MINNESOTA, IN RESPONSE TO RESOLUTIONS OF THE SENATE COMMITTEE ON COMMERCE AND THE HOUSE COMMITTEE ON PUBLIC WORKS ADOPTED JULY 10, 1945, AND JULY 1, 1958, RESPECTIVELY

JUNE 8, 1979.—Referred to the Committee on Public Works and Transportation and ordered to be printed

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U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1979

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LETTER OF TRANSMITTAL

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D.C. 20310

MAY [illegible] 1979

Honorable Thomas P. O'Neill, Jr.
Speaker of the House of Representatives
Washington, D. C. 20515

Dear Mr. Speaker:

I am transmitting herewith a favorable report dated 22 July 1977, from the Chief of Engineers, Department of the Army, on Des Moines River Basin, Iowa and Minnesota, together with other pertinent reports. The report has been prepared in response to a resolution adopted 10 July 1945 by the Committee on Commerce, United States Senate, and to a resolution adopted 1 July 1958 by the Committee on Public Works, United States House of Representatives.

The views of the Governor of Iowa; the Departments of the Interior; Agriculture; Transportation; Housing and Urban Development; and the Environmental Protection Agency are set forth in the inclosed communications. The environmental statement required by the National Environmental Policy Act of 1969 has been submitted to the Environmental Protection Agency.

The President, in his June 6, 1978 water policy message to Congress, proposed several changes in cost sharing for water resources projects to allow states to participate more actively in project implementation decisions and to equalize cost sharing between structural and non-structural flood control projects. The changes include a cash contribution from benefiting states of 5% of construction (first) costs associated with nonvendible outputs and 10% of costs associated with vendible outputs. The President also proposed that the present cost-sharing requirements for flood control projects be modified to require a cash or in-kind contribution equal to 20% of the project first costs associated with flood control benefits.

At January 1977 price levels, the total estimated first cost of the local protection project for West Des Moines and a portion of Des Moines, Iowa, recommended in the Des Moines River Basin report, is $8,350,000 including about $350,000 for recreational developments. Application of the President's proposed policies to the project would require the State of Iowa to contribute an estimated $420,000 in cash (5% of $8,350,000 for flood control and recreation, rounded).

In addition to the state contribution, non-Federal interests would be required to make a cash or in-kind contribution of an estimated $1,600,000 (20% of $8,000,000) toward flood control costs. Application of the President's proposed policies would not alter requirements for non-Federal interests cash or in-kind contribution toward recreational developments which, based on the present plans and January 1977 price levels, would be $220,000. In total, the non-Federal share of project first costs shown in the report of the Chief of Engineers would change from $1,750,000 to about $2,240,000.

I recommend construction authorization for the Des Moines project in accordance with the President's proposed cost-sharing policy.

Also, current policy requires that recreation development at local protection projects be limited to lands acquired for flood control purposes. Therefore, recreation plans will be refined in post-authorization planning to comply with this policy.

The Office of Management and Budget advises that there is no objection to submission of the Chief of Engineers report to the Congress nor to authorization of the proposed project as amended to conform with the President's water policy. However, it states that no commitment can be made at this time as to when appropriations would be requested for the project, if authorized by the Congress, since this would be subject to review in the President's annual budget process. A copy of the letter from the Office of Management and Budget is inclosed as part of the report.

Sincerely,

Michael Blumenfeld
Assistant Secretary of the Army
(Civil Works)

1 Incl
As stated

COMMENTS OF THE OFFICE OF MANAGEMENT AND BUDGET

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

April 12, 1979

Honorable Clifford Alexander
Secretary of the Army
Washington, D.C. 20310

Dear Mr. Secretary:

Deputy Under Secretary Michael Blumenfeld's letter of December 11, 1978, submitted the report of the Chief of Engineers on Des Moines River Basin, Iowa and Minnesota, in accordance with Section 4 of Executive Order No. 9384, and requested information as to the relationship of the report to the program of the President.

We have reviewed the report of the Chief of Engineers in light of the President's Water Policy Message to the Congress of June 6, 1978. We conclude that the Des Moines River Basin project, if modified, would meet the criteria specified in that message.

We note that your proposed letters to the Speaker of the House of Representatives and the Chairman, Committee on Environment and Public Works of the Senate recommend the necessary modifications to the project to conform it to the cost-sharing policies adopted by the President.

There would be no objection to the transmission of the report to the Congress if modified as you have proposed, from the standpoint of the President's water policy. No commitment, however, can be made at this time as to when appropriations would be requested for the project, if authorized by the Congress, since this would be subject to review in the President's annual budget process.

Sincerely,

Eliot R. Cutler
Associate Director for
Natural Resources,
Energy and Science

COMMENTS OF THE GOVERNOR OF IOWA

Office of the Governor
STATE CAPITOL
DES MOINES, IOWA 50319

ROBERT D. RAY
GOVERNOR

November 4, 1976

Lieutenant General J. W. Morris
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Morris:

Re: Feasibility Study for Flood Damage Reduction and Related Purposes, Des Moines River Basin, Iowa and Minnesota

The subject report and environmental impact statement transmitted to the State of Iowa, in accordance with the provisions of Public Laws 78-534, 85-624, and 91-190, have been distributed to members of our Inter-Agency Resource Council, which includes the Iowa Conservation Commission, the agency responsible for fish and wildlife, and to other interested agencies and individuals for comment. Further, interested persons have been given an opportunity to present their comments at a public hearing held by the Iowa Natural Resources Council on October 5, 1976, at West Des Moines, Iowa.

Based on response from the agencies and individuals to which the report and environmental statement were distributed and the evidence presented as a result of the October 5, 1976, public hearing, the following comments are submitted on behalf of the State of Iowa.

1. The function of providing flood protection to portions of the cities of Des Moines and West Des Moines is considered to be justifiable as a recognized hazard from flooding does exist in the area proposed for protection.

2. The project is responsive to water and related resource problems of flood prone areas of Des Moines and West Des Moines by providing a high degree of flood protection to existing industrial, commercial and residential development and incorporates provisions for recreation into the project design.

3. While the project as proposed is not incompatible with comprehensive water resource plans of a regional or river basin nature, said project does not necessarily relate to needs which may be associated with rural and urban runoff within the Raccoon River Basin.

4. To be assured of compatibility with state and local water resource interests, it is requested during post-authorization advanced engineering design:

   a. Consideration be given to investigating the feasibility of channel cleanout or other structural or nonstructural flood plain management techniques to minimize the increase in stage or else mitigate the effects of an increased stage along Jordan Creek in the vicinity of the Chicago, Rock Island and Pacific Railroad bridge.

   b. Reconsideration be given to nonstructural and structural flood plain management techniques along the reach of Walnut Creek in an effort to provide as much flood protection as possible to property owners not presently included in the protection of the proposed project, and that such reconsideration include the possibility of further improving the channel capacity and floodwater conveyance along Walnut Creek in the vicinity of Grand Avenue.

   c. Reconsideration be given to the location of the river access and boat ramp adjacent to the Raccoon River and 63rd Street, such that the best possible location is achieved.

5. Benefits to be derived from the proposed project will exceed costs.

6. Although most of the significant environmental effects have been studied, all possible related mitigation measures should again be reviewed during post-authorization advanced engineering design.

7. The impact on the Des Moines Water Works during the construction phase of the project needs to be addressed in the Environmental Impact Statement.

Subject to the preceding comments, I concur in the recommendations contained in the report and urge that the report be forwarded to Congress for consideration at the earliest possible date.

Sincerely,

Robert D Ray

Robert D. Ray
Governor

RDR:kjd

COMMENTS OF THE DEPARTMENT OF THE INTERIOR

United States Department of the Interior
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

PEP ER-76/823

DEC 15 1976

Dear General Morris:

This is in response to your August 16, 1976, letter requesting Department of the Interior's comments and recommendations on your proposed report and revised draft environmental impact statement on Des Moines River Basin, Iowa and Minnesota.

Chief of Engineers' Proposed Report

We have no substantive comments to offer on this report.

Revised Environmental Impact Statement

The approximate location of infiltration galleries for ground water collection should be shown on the maps or figures to indicate the relation to proposed structures or areas influenced by them. This would allow evaluation of the potential project impacts on the movement and quality of the ground-water resources. Existing or needed floodproofing for floodplain facilities related to the infiltration galleries should also be described. Sufficient information on the proposed pumping stations should be included to permit evaluation of the potential for impacts on ground water.

Contrary to the belief expressed in the Bureau of Mines May 16 memorandum, we now believe that the project may have a significant adverse impact on recovery of sand and gravel resources in the flood plain of the Raccoon River. A limited amount of sand and gravel would be lost under the proposed levees, and committed beneath proposed ponding areas if not recovered beforehand. We are more concerned, however, about the effect on active mineral operations and future recovery of available sand and gravel resources that remain in areas adjacent to project structures. The final locations selected for levee construction should consider the probable impact on these resources because fragmentation of sand and gravel deposits would hamper, and perhaps preclude, recovery of significant amounts of the resource.

Sand and gravel deposits in the project area are important because of their size and proximity to markets in the metropolitan area. We believe that every effort should be made to recover all available sand and gravel resources in the project area before the land is dedicated to other uses which would preclude its recovery.

Any analysis of project impacts on sand and gravel resources should include a discussion of the magnitude of the resource affected, and an assessment of the overall effect on the availability of sand and gravel resources in the Des Moines area.

We suggest that the effect of the project on sand and gravel resources and operations be described more precisely. For example, the sentence about mining in paragraph 2.032 should be recast to show that Polk County is the leading source of sand and gravel in Iowa and that a significant part of the production and available resources near the metropolitan area, are in the project area. The county is a leading cement-producing area in the State, and the Penn-Dixie Plant, which is adjacent to the project in West Des Moines, presumably would be among the beneficiaries of proposed improvements for flood control. Section IV, especially, should be expanded to describe all impacts of the proposed action on sand and gravel resources.

Paragraph 4.021 should be clarified to indicate that some volume of borrow material will be removed from a 44-acre area.

We believe that the glossary definition of Pleistocene is misleading and not in agreement with general usage. We recommend that the definition read "The time of most recent extensive glaciation, extending from about 1.5 - 2 million years ago up to the beginning of present (Holocene) time."

We appreciate the opportunity to comment on these documents.

Sincerely yours,

Deputy Assistant Secretary of the Interior

J. W. Morris
Lieutenant General, USA
Chief of Engineers
Department of the Army
Washington, D. C. 20314

COMMENTS OF THE DEPARTMENT OF AGRICULTURE

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

11 November 197

Lieutenant General J. W. Morris
Chief of Engineers
Office of the Chief of Engineers
Army Corps of Engineers
U. S. Department of the Army
Washington, D. C.

Dear General Morris:

This is in response to your letter of August 16, 1976, transmitting for our review and comments your report with pertinent papers and revised draft environmental impact statement on Des Moines River Basin, Iowa and Minnesota.

We are enclosing comments for your use in preparing the final report and environmental impact statement.

Sincerely,

ROBERT W. LONG
Assistant Secretary

Enclosure

U. S. Department of Agriculture
Comments on Report and Draft Environmental Impact Statement
Des Moines River Basin, Iowa and Minnesota

1. The section on resources and economy of the study area, pages 8-14, would benefit from clearer map delineation of the regions of the basin.

2. The correlation of tables F-7, F-10, and F-11 (pages F-21 and 25) are not clear. If table F-7 contains future growth values and additional flood plain development was not included (paragraph 41, page F-26), what is the nature of future benefits noted in paragraph 40, page F-25, and how were they used in the benefit analysis? Additional explanation in paragraph 40 would be helpful.

3. The discussion of recreation benefits on page F-31 would be strengthened by including the estimates of visitors per year and the value used per visitor day.

4. Environmental Impact Statement - On page 73 of the plan it is noted that one business and seven homes will be relocated as a result of the proposed project. The environmental impact statement does not list this as an impact.

5. The plan notes that 44 acres of agricultural land and 22 acres of forest land will be affected by the project. While these acreages are quite small, their relationship as to total acreage and quality of agricultural and forest land should be noted. The environmental impact statement should note this relationship to properly assess the impact.

COMMENTS OF THE DEPARTMENT OF TRANSPORTATION

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
400 SEVENTH STREET SW.
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

• 12 November 1976

Lieutenant General J. W. Morris
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Morris:

This is in response to your letter of 16 August 1976 addressed to Secretary Coleman concerning a revised draft environmental impact statement on Des Moines River Basin, Iowa and Minnesota.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. The Coast Guard commented as follows:

"Boater education and boating safety should have a place in the planning of recreational improvements in this project."

The Department of Transportation has no other comments to offer nor do we have any objections to this project. The final statement, however, should address the concerns of the Coast Guard.

The opportunity to review this draft statement is appreciated.

Sincerely,

D Riley

D. J. RILEY
Captain, U. S. Coast Guard
Acting Chief, Office of Marine
Environment and Systems

COMMENTS OF THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
OMAHA AREA OFFICE
UNIVAC BUILDING, 7100 WEST CENTER ROAD
OMAHA, NEBRASKA 68106

REGION VII
Room 300 Federal Office Building
911 Walnut Street
Kansas City, Missouri 64106

August 31, 1976

IN REPLY REFER TO:
7.2SS

Lieutenant General J. W. Morris
Chief of Engineers
Corps of Engineers
Washington, D. C. 20314

Dear General Morris:

I have reviewed the Draft Environmental Statement for Flood Protection in the Des Moines River Basin, and have found the document to be satisfactory in meeting the spirit and intent of the National Environmental Policy Act of 1969.

This determination was made on the basis of the following considerations: (1) HUD's areas of review responsibility in accordance with NEPA, and (2) HUD's activities in the Des Moines area that might be affected by the Environmental Statement.

Sincerely,

Stanley V. Quy
Environmental Clearance Officer

COMMENTS OF THE ENVIRONMENTAL PROTECTION AGENCY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VII
1735 BALTIMORE
KANSAS CITY, MISSOURI 64108,

October 14, 1976

Colonel Daniel L. Lycan, USA
District Engineer
Rock Island District
U.S. Army Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Lycan:

West Des Moines and Des Moines, Iowa
Local Flood Protection Project

We have reviewed the Revised Draft Environmental Statement for the project identified above. The project and statement have been rated LO-1. This rating means we have a lack of objections to the project as proposed and believe the statement provided an adequate appraisal of the proposed action.

The proposed project was reviewed by this agency and comments sent to your office on May 16, 1975. The additional information in the revised statement and your responses to our original comments provided sufficient data to alleviate our concerns with the project.

Thank you for the opportunity to review and comment on the revised draft statement. Please provide this office with one copy of the revised final statement when it is filed with the Council on Environmental Quality.

Sincerely yours,

Jerome H. Svore
Regional Administrator

DES MOINES RIVER BASIN, IOWA AND MINNESOTA

REPORT OF THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314

REPLY TO
ATTENTION OF:

DAEN-CWP-A

22 July 1977

SUBJECT: Des Moines River Basin, Iowa and Minnesota

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress the report of the Board of Engineers for Rivers and Harbors, accompanied by the reports of the District and Division Engineers, in response to a resolution adopted 10 July 1945 by the Committee on Commerce, United States Senate, and to a resolution adopted 1 July 1958 by the Committee on Public Works, United States House of Representatives. The reports constitute the final study to be made by the reporting officers under these resolutions. A previously submitted interim report resulted in the authorization of the Saylorville Lake project on the Des Moines River upstream from the city of Des Moines. Construction of the Saylorville Lake project is nearing completion.

2. Although a number of potential projects were considered in the study, the District and Division Engineers only recommend a project for flood control in the West Des Moines-Des Moines area, consisting of levees, short reaches of concrete floodwall, appurtenant works, and recreation facilities. The first cost of the project is estimated at $7,149,000, of which $5,643,000 would be the Federal construction cost, and $1,506,000 would be the non-Federal cost for lands, easements, rights-of-way, relocations, and recreation facilities. Based on an interest rate of 6-1/8 percent, the annual charges are estimated at $496,000, including $24,000 for non-Federal maintenance, operation, and replacements. Over the life of the project, average annual benefits are estimated to be $1,169,000, and the benefit-cost ratio is 2.4.

3. The Board of Engineers for Rivers and Harbors concurs generally in the findings of the reporting officers and recommends the improvements subject to certain items of local cooperation.

4. I concur in the views and recommendations of the Board.

5. Revised policy guidelines have recently been established for recreation facilities at structural local flood protection projects. These guidelines recognize the need for day-use type activities and

facilities in urban settings and the water and related land base potential associated with structural local flood protection projects. It also recognizes that certain facilities are inappropriate for Federal participation because they are normally provided by private enterprise and that other Federal programs have been established for development of recreation beyond the potential associated with the flood control project. On this basis, recreation developments will be provided within the lands acquired by local interests for the basic flood control project, except for lands required for access, parking, potable water, sanitation and related developments for health, safety and public access. Financial participation will not result in an increase of more than 10 percent in the Federal cost of the flood control project except in unusual cases and inclusion of recreation will not influence formulation of the flood control project.

6. Application of the revised recreation policy to Des Moines River Basin, Iowa and Minnesota will not result in a reduction in the scope of recreational development (lands and facilities) to be implemented as a part of the flood control project as presently planned.

7. Based on January 1977 price levels, the estimated first cost of the project is $8,350,000, of which $6,600,000 would be Federal. Use of the currently prescribed interest rate of 6-3/8 percent together with the recent price levels results in a benefit-cost ratio of 2.2.

Ernest Graves
ERNEST GRAVES
Major General, USA
Acting Chief of Engineers

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE ARMY
BOARD OF ENGINEERS FOR RIVERS AND HARBORS
KINGMAN BUILDING
FORT BELVOIR, VIRGINIA 22060

REPLY TO
ATTENTION OF:

DAEN-BR 23 January 1976

SUBECT: Feasibility Study for Flood Damage Reduction and Related Purposes, Des Moines River Basin, Iowa and Minnesota

Chief of Engineers
Department of the Army
Washington, D.C.

1. Authority.--This report is in response to the following resolutions adopted 10 July 1945 and 1 July 1958, respectively:

> Resolved by the Committee on Commerce of the United States Senate, That the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act, approved June 13, 1902, be, and is hereby, requested to review the report on the Des Moines River, Iowa, printed in House Document Numbered 651, Seventy-eighth Congress, Second Session, with a view to determining whether any modification therein should be made at this time with respect to flood control and related purposes on the Des Moines River as a part of the comprehensive system of reservoirs for the Upper Mississippi River Basin, particularly with reference to the advisability of providing additional flood protection for the city of Des Moines, Iowa, by the construction of additional reservoirs on the Raccoon and Des Moines Rivers.

> Resolved by the Committee on Public Works of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors be, and is hereby, requested to review the reports on the Des Moines River, contained in House Document 651, 78th Congress, with particular reference to the Upper Des Moines River and the tributaries thereof, to determine the feasibility and justification of improvements for flood control and related purposes.

2. Description.--The watershed of the Des Moines River, which includes all or parts of 7 counties in Minnesota, 39 counties in Iowa, and 1 county in Missouri, has an area of about 14,540 square miles. The basin is about 360 miles long and 40 miles wide. Its major tributaries are East and West Forks, Boone River, Raccoon River, Middle River, and South River. Most of the basin is productive farmland.

3. Economic development.--The economy is largely agricultural, but industrialization in major population centers is rapidly expanding. Coal and gypsum are mined in certain areas. Clay, suitable for brick and tile, is found in some localities, and limestone and shale are quarried in the vicinity of Des Moines. The larger cities are Des Moines, Fort Dodge, and Ottumwa.

4. Existing and planned improvements.--The Red Rock Dam and Lake Red Rock project, on the Des Moines River downstream from the city of Des Moines, was authorized in 1938 and has been in operation since 1969. A local flood protection project at Des Moines was authorized in 1944, and construction was completed in 1971. The Saylorville Lake project was authorized in the Flood Control Act of 1958, and construction is now nearing completion. A project to relieve basement flooding in the central business district at Ottumwa was authorized in 1972, and is in the preconstruction planning stage. Under authority of Section 205 of the 1948 Flood Control Act, small flood control projects have been constructed at Van Meter, Iowa, and Worthington, Minnesota. Also under Section 205 authority, flood problems were studied at Webster City, Iowa, and at Fourmile Creek at Des Moines. Flood plain information studies have been completed on the North Raccoon River at Sac City, Iowa, on the Des Moines River between Saylorville Lake and the Center Street Dam in Des Moines, and on the West Fork Des Moines River at Windom, Minnesota. A stream erosion study for reaches of the Des Moines River is being done under separate authority.

5. Flood problem.--Periodic flooding in the Des Moines River Basin causes urban damage and crop loss. Flooding may occur from the Des Moines River or from its many tributary streams. Much of the damage is to agricultural land. However, population growth in some urban communities has caused increased usage of flood plain land. Major floods occurred as early as 1851. More recent floods took place in June 1903, June 1947, the spring of 1965, and April 1969. Basinwide, the floods of 1903 and 1947 were the most damaging. Areas of most severe flooding are:

a. West Fork of the Des Moines River, Iowa;

b. Des Moines River downstream from the Saylorville Dam, Iowa;

c. Raccoon River in Polk, Dallas, and Greene Counties, Iowa;

d. Beaver Creek in Polk and Dallas Counties, Iowa;

e. Walnut Creek at the city of West Des Moines, Iowa;

f. Boone River at Webster City, Iowa; and

g. Fourmile Creek at Des Moines, Iowa.

6. Improvements desired.--In 1959, local interests indicated their concern over flooding along the Des Moines, East Fork, West Fork, Boone, and Raccoon Rivers, along Walnut and Lizard Creeks, and a small stream at Van Meter, Iowa. In 1970, local interests generally favored the construction of a reservoir for flood control and other purposes on the Raccoon River upstream of Jefferson, Iowa. Local views were about equally divided between support for, and in opposition to, the reservoir. Also, in 1970 local interests generally favored a multiple-purpose reservoir on Walnut Creek, local protection works in the Des Moines-West Des Moines area, and environmental corridors along the Des Moines River and Walnut Creek. In May 1975, local interests gave general support to a local protection plan in the West Des Moines-Des Moines area.

7. Improvements considered.--A number of solutions to flood problems in the Des Moines River Basin were considered but not recommended.

a. Jefferson Reservoir and Walnut Creek Reservoir. The projects were economically unjustified without recreation benefits. Local sponsors indicated lack of support for recreational cost sharing.

b. Des Moines River Environmental Corridor. The Des Moines River environmental corridor project downstream from Saylorville Dam is being studied as a modification of the Saylorville Lake project.

c. Walnut Creek Environmental Corridor. The lack of a local sponsor for this project and the lack of interest in a reservoir on Walnut Creek resulted in these projects being eliminated from further consideration.

d. Fourmile Creek at Des Moines, Iowa. At the request of the city of Des Moines, a project for flood control was studied under the authority of Section 205 of the 1948 Flood Control Act. A report completed by the reporting officers in May 1975 indicates that flood reduction measures along Fourmile Creek are not justified.

8. Plan of improvement.--The recommended plan of improvement consists of about 5 miles of new and improved earth levee and short sections of floodwall along Raccoon River, Walnut Creek, and Jordan Creek. Interior drainage will require about 70 acres of ponding area and three pumping plants. Appurtenant works include raising one street, sandbag closures for streets and railroads, several gated closures, road ramps, and relocations. Also included are recreation facilities consisting of bicycle trails, a fishermen's access point, and a small open space park.

9. Project impacts -

a. National Economic Development. Average annual benefits for flood control and recreation are estimated at $1,133,000 and $36,000, respectively.

b. Environmental Quality.

(1) Physical and visual access to Walnut Creek would be reduced.

(2) Total area now in open and green spaces would be reduced.

(3) Levee system would discourage encroachment on the riverward side of the flood plain.

(4) Natural resource losses would include 20 acres of flood plain wildlife habitat, 33 acres of urban flood plain, disruption of 70 acres of urban flood plain for ponding areas, and 44 acres of farmland for borrow areas.

c. Regional Development. There would be no significant adverse impact.

d. Social Well-Being.

(1) Flood hazard to life and property would be reduced.

(2) The sewer system and waterplant would be protected.

(3) Two families and one business would be displaced.

(4) Community cohesion would be enhanced with stability of population and commerce.

(5) Recreation facilities would be provided.

10. Economic evaluation. --Based on March 1975 price levels, a 100-year period for economic analysis, and an interest rate of 6-1/8 percent, the District Engineer estimates project costs and benefits as follows:

First costs:	
Federal	$5,643,000
Non-Federal	1,506,000
Total first costs	$7,149,000
Annual charges:	
Federal	$368,000
Non-Federal	128,000
Total annual charges	$496,000
Annual benefits:	
Existing conditions	$816,000
Future conditions	$1,169,000
Benefit-cost ratios:	
Existing conditions	1.6
Future conditions	2.4

11. Recommendations of the reporting officers. --The District Engineer recommends authorization of the proposed improvements for flood control and recreation at Des Moines and West Des Moines, Iowa, generally in accordance with plans described in his report and subject to certain items of local cooperation. The Division Engineer concurs.

12. Public notice. --The Division Engineer issued a public notice stating the recommendations of the reporting officers and affording interested parties an opportunity to present additional information to the Board. Careful consideration has been given to the communications received.

Views and Recommendations of the Board of Engineers for Rivers and Harbors.

13. Views. --The Board of Engineers for Rivers and Harbors concurs in general in the views and recommendations of the reporting officers.

The proposed project is needed and is economically justified. The conditions of local cooperation are appropriate, and local interests have indicated their intent to participate in the project. The Board notes that non-Federal first costs associated with the requirements of local cooperation are presently estimated at $1,228,000 for flood control and $278,000 for recreation. Annual operation and maintenance costs of the flood control and recreation features are presently estimated at $24,000.

14. The Board has carefully considered the report as to its compliance with the requirements of the Principles and Standards for Planning Water and Related Land Resources established by the Water Resources Council. It believes that the intent of the Principles and Standards has been fulfilled, and that the recommendations of the reporting officers have been developed through the application of prescribed planning procedures contained therein to meet the objectives of national economic development and environmental quality. The effects on regional development and social well-being were evaluated, and the Board believes that the proposed improvements would provide a significant contribution to the regional economy and improvement of social well-being. The Board has also carefully considered the environmental effects, including those discussed in the Revised Draft Environmental Impact Statement (RDEIS) dated June 1975, and notes that the proposed improvements are not expected to have major adverse effects. It believes that the increase in degree of protection above that discussed in the June 1975 RDEIS, and the addition of some recreation facilities, would not result in changed impacts significant enough to warrant additional coordination of the RDEIS at this time.

15. Recommendations.--Accordingly, the Board recommends that the improvements for flood control be authorized for construction at Des Moines and West Des Moines, Iowa, generally in accordance with the plans of the District Engineer, and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable. The first cost to the United States is presently estimated at $5,643,000. This recommendation is made, provided that, prior to the commencement of construction, non-Federal interests will agree to:

a. Provide without cost to the United States all lands, easements, and rights-of-way, including ponding areas and suitable areas for borrow and disposal of excavated material as determined by the Chief of Engineers, necessary for construction of the project;

b. Hold and save the United States free from damages due to the construction works, not including damages due to the fault or negligence of the United States or its contractors;

c. Operate and maintain all the works after completion of the project in accordance with regulations prescribed by the Secretary of the Army;

d. Accomplish without cost to the United States all alterations and relocations of buildings, transportation facilities, storm drains, utilities, and other structures and improvements made necessary by the construction, excluding railroad bridge approaches and facilities necessary for the normal interception and disposal of local interior drainage within the construction limits of the project structures;

e. Prescribe and enforce regulations to prevent obstruction or encroachment on channels and interior ponding areas which would reduce their flood-carrying capacity or hinder maintenance and operation;

f. Provide a cash contribution for recreation equal to 50 percent of the final separable cost allocated to this function less a credit for the value of lands, easements, rights-of-way, alterations, and relocations allocated therefor; and

g. Publicize flood plain information in the areas concerned and provide this information to zoning and other regulatory agencies for their guidance and leadership in preventing unwise future development in the flood plain and in adopting such regulations as may be necessary to insure compatibility between future development and protection levels provided by the project.

16. Provided further that, unless otherwise stated in these recommendations, the exact amount of non-Federal contributions shall be determined by the Chief of Engineers in accordance with these recommendations, upon the determination of final construction costs.

FOR THE BOARD:

JW Morris

J. W. MORRIS
Major General, USA
Chairman

SYLLABUS

This study was requested and authorized to investigate flooding and related water resource problems of the Des Moines River Basin. Several authorizing resolutions and resulting studies, reports, and implemented or authorized improvements narrowed the scope of study by reducing the flood damage in the basin.

The Des Moines River flows for about 535 miles from southwestern Minnesota to just south of Keokuk, Iowa. Its major tributaries include the East and West Forks, the Boone River, Raccoon River, Middle River, and South River. Each of these streams has caused some degree of periodic flooding and related flood damages.

Initial solutions investigated included both structural and nonstructural alternatives for the basin. Six alternatives which would reduce basin flooding were determined feasible. All but one project was eliminated from further consideration by the completion of separate studies and implementation of some projects as a result of those studies. This remaining plan which provides Standard Project Flood protection for the city of West Des Moines and a small portion of Des Moines was selected for recommendation.

The selected plan involves about 5 miles of new and improved levees and 600 feet of concrete floodwall. The plan also includes bicycle paths, a boat ramp, fishing piers, and a small park. It has minimal adverse environmental effects and provides measures to at least partially mitigate those. The estimated first cost is $7,149,000. The equivalent average annual cost computed at 6-1/8 percent interest is $495,467. The estimated annual benefits are $815,700 under existing conditions, and $1,168,900 under future conditions. The resulting benefit-to-cost ratios are 1.65 and 2.36, respectively. The District Engineer recommends the plan for implementation.

U.S. ARMY ENGINEER DISTRICT
ROCK ISLAND
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS

FEASIBILITY STUDY
FOR
DAMAGE REDUCTION AND RELATED PURPOSES
DES MOINES RIVER BASIN
IOWA AND MINNESOTA
JUNE 1975

THE STUDY AND THE REPORT

Flooding and related water resources problems of the Des Moines River Basin were considered in this study. The report summarizes the investigations and presents their results.

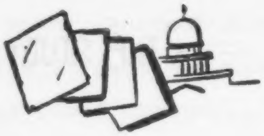
PURPOSE AND AUTHORITY

Flooding within the Des Moines River Basin prompted local interests to request Congressional representatives to authorize a study of the Basin's flood problems. A resolution adopted by Congress on 10 July 1945 directed the Corps of Engineers to review previous reports to find a feasible plan for flood

control and related purposes. A second resolution adopted 1 July 1958 authorized a review of an earlier report investigating feasible improvements for flood control and related purposes on the Des Moines.

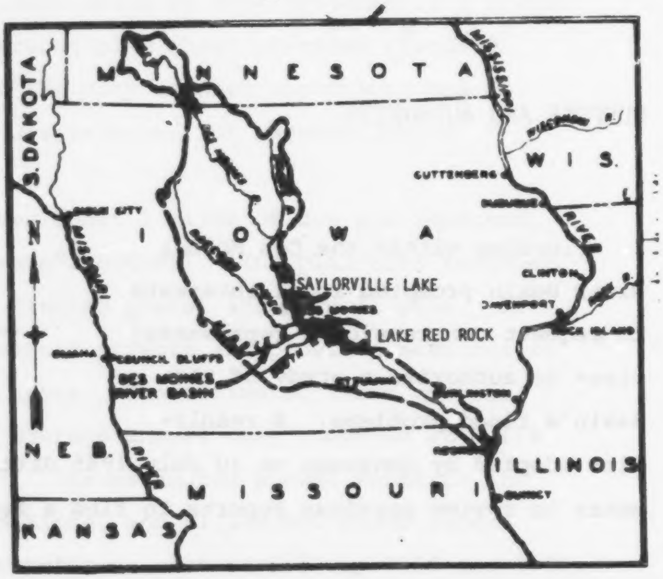
Interim studies and reports have been completed, flood control improvements have been constructed, and flood plain information studies have been conducted in response to the initial authorizing resolutions.

The report is a culmination of those studies and investigations. It presents a summary of the study's history, a description of the investigations made and the alternative solutions considered, and recommends a plan for implementation.



SCOPE OF THE STUDY

The study area included the Des Moines River Basin. Identifying and categorizing flood problems and related water resource needs were the basis for initial investigations. Related study considerations included recreation, water quality, water supply, and fish and wildlife enhancement.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LAKE RED ROCK
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DAVENPORT
ROCK ISLAND
OMAHA
COUNCIL BLUFFS
DES MOINES
RIVER BASIN
OTTUMWA
BURLINGTON
NEB.
RIVER
ILLINOIS
MISSOURI
QUINCY
KANSAS

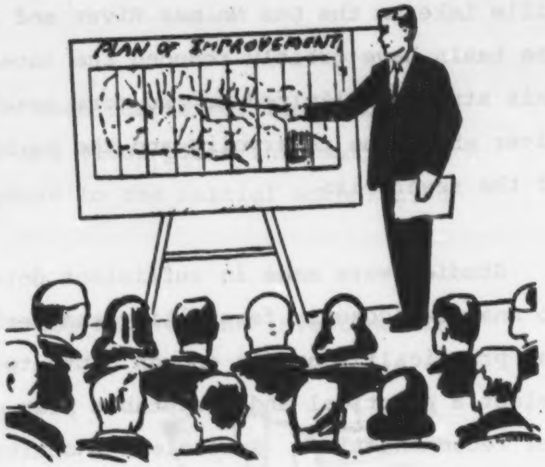
Since the original authorizing legislation, significant changes occurred in the Des Moines River Basin which altered the flood problems of the basin. Construction of both Lake Red Rock and Saylorville Lake on the Des Moines River and local protection projects in the basin have greatly reduced the threat of flooding. As a result, this study was limited to two more specific areas--the Des Moines River above the reservoirs and the tributary streams downstream of the reservoirs.

Studies were made in sufficient detail to analyze economic feasibility and technical practicality and in enough depth to select a practical and acceptable plan for recommendation. Sufficient technical data were developed to prepare plans and specifications should the recommended plan be implemented.

STUDY PARTICIPANTS AND COORDINATION

The public involvement program in this study has been a continuous process since the initial investigations began. Coordination has been maintained with both the affected and the general public and with local, State, and Federal agencies. (The affected public is considered to be those people directly affected by flooding or the construction of flood control structures. The general public are individuals or agencies with interests in the affected area.)

Five public hearings were held in 1959 to allow local residents to offer their views and suggestions on the flood problems. In 1970, several meetings were held with local officials to familiarize them with the preliminary plans and proposals of the investigation. Three public meetings were held during 1970 to describe the improvements to the general public and to obtain views on each proposal. A public meeting was held in West Des Moines, Iowa, in May 1975 to discuss the Draft Feasibility Report.



THE REPORT

The results of the Des Moines River Basin Study are organized into three parts--the main report and two appendices. The main report is a summary of the important aspects of the study. It gives a general, overall view of the investigations and recommendations and is directed toward both the technical and nontechnical reader. Appendix 1, the Technical Report, contains more detailed information and is basically intended for the technical reviewer. Appendix 2 contains correspondence that is pertinent to the study. Both the main and the technical report are organized in the same format. Each part of the report is designed to be read independently.

MAIN REPORT

PRIOR STUDIES AND REPORTS

Several reports have been completed concerning investigations of flood problems in Des Moines River Basin. Some of these studies and reports have resulted in the construction of flood control projects.

Red Rock Dam and Lake on the Des Moines River downstream from the city of Des Moines and the Des Moines Local Protection Project were authorized in 1938 and are now constructed and in operation.

Saylorville Dam and Lake project, which is nearing completion on the Des Moines River upstream of the city of Des Moines, was authorized based on an Interim Report submitted under the authority of one of the resolutions for this study adopted on July 1945. The Des Moines and Mississippi River Levee District No. 1 Protective Levees have been improved and two small local protection projects placed in operation at Van Meter, Iowa, and Worthington, Minnesota, as a result of the interim studies and reports.

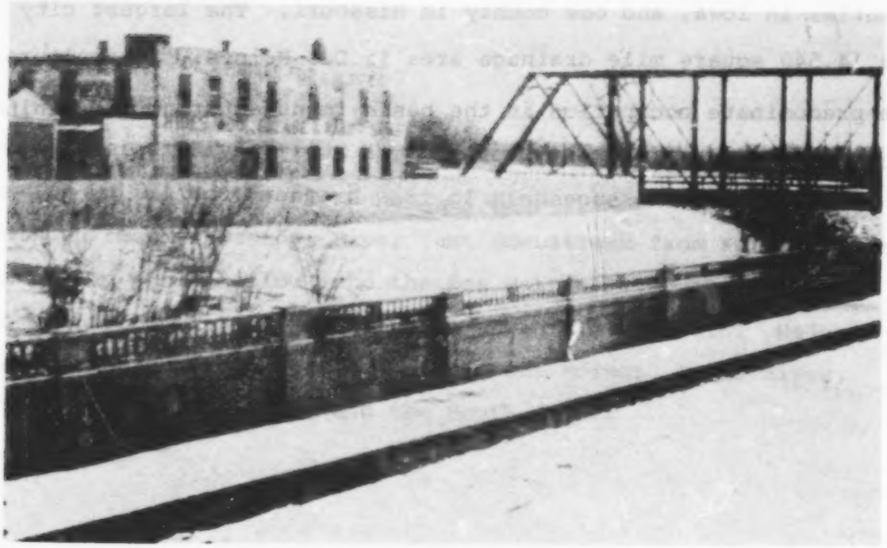
Seven survey reports have been prepared for the Basin. Six addressed flood control problems and one concerned feasibility of navigation development on the Des Moines River. In addition, a review survey report was prepared and a comprehensive report published by the Upper Mississippi River Basin Commission. Nine reports concerning small flood control projects for communities were prepared and 3 flood plain information reports have been completed.

Development of an environmental corridor for Walnut Creek and for the Des Moines River has been considered. The Des Moines River Environmental Corridor study is currently proposed as a modification to the Saylorville Lake Project. Unpublished studies involving the feasibility of reservoirs for flood control throughout the Des Moines River Basin have been completed and twelve interrelated reservoir sites have been studied.

RED ROCK RESERVOIR - DES MOINES RIVER, IOWA
Aerial view looking upstream toward Lake Red Rock

SAYLORVILLE RESERVOIR - DES MOINES RIVER, IOWA
Aerial view looking upstream - Project nearing completion

DES MOINES LOCAL PROTECTION - DES MOINES, IOWA
View along left bank Des Moines River



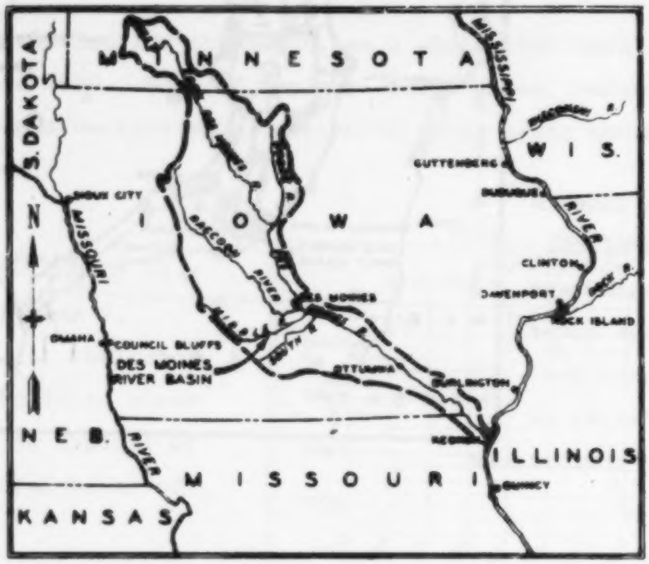
DES MOINES LOCAL PROTECTION - DES MOINES, IOWA
View along right bank Des Moines River

Besides the completed studies, several studies and reports are in progress. The flood problems at Webster City, Iowa, are being restudied under the authorities concerning small projects and a draft report is being scheduled for submission before 1 July 1975. A draft report considering the flood problems on Fourmile Creek at Des Moines, Iowa, is also being prepared under the small project authority. This report is also scheduled for submission by 1 July 1975.

RESOURCES AND ECONOMY OF THE STUDY AREA

The Des Moines River Basin includes seven counties in Minnesota, 39 counties in Iowa, and one county in Missouri. The largest city in the 14,540 square mile drainage area is Des Moines. Agriculture is the predominate occupation in the basin; manufacturing and mining are the major industries.

MAJOR STREAMS OF THE BASIN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ROCK ISLAND
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OTTUMWA
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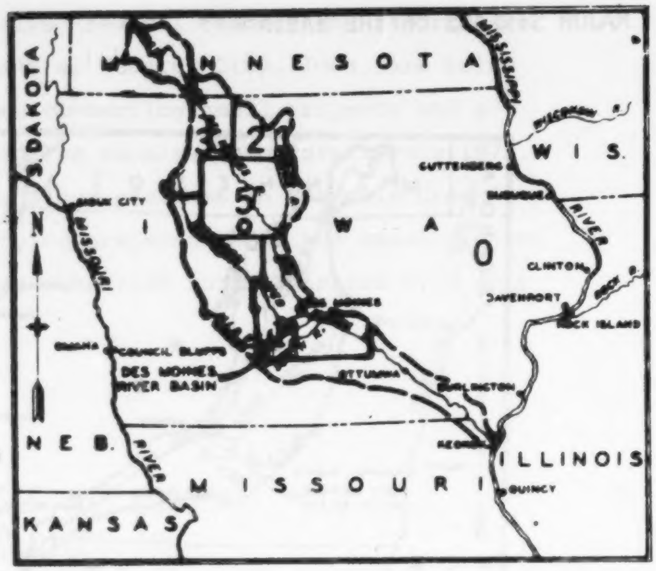
ILLINOIS
MISSOURI
QUINCY
KANSAS

The Des Moines River flows southeasterly for about 535 miles, originating in the southwestern part of Minnesota and extending to its mouth on the Mississippi River just downstream from Keokuk, Iowa. Many tributary streams flow into the Des Moines River as it wanders through the predominately agricultural areas of the basin. Major tributaries include the West Fork of the Des Moines, Boone River, Raccoon River, Middle River, and the South River.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OMAHA
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DES MOINES RIVER BASIN
OTTUMWA
BURLINGTON
KEOKUK
NEB.
RIVER
MISSOURI
ILLINOIS
QUINCY
KANSAS

REGIONAL SKETCHES

To provide a more indepth view of the resources of the basin, regional sketches were developed. Each sketch covers an area of the watershed and is based on the boundaries of the regional planning commissions.

ENVIRONMENTAL SETTING AND NATURAL RESOURCES

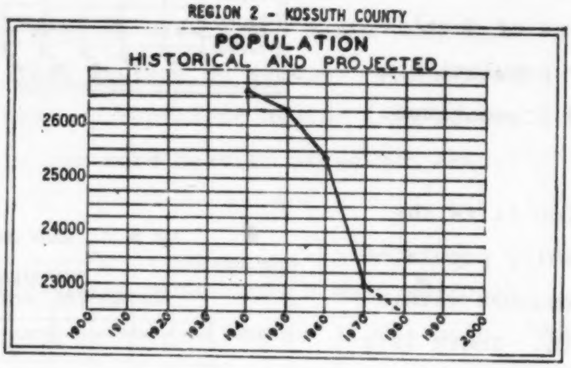
The most important resource of the Des Moines River Basin is its rich farmland. Coal and gypsum are mined in certain areas; clay, suitable for brick and tile, is found in some localities within the basin; and limestone and shale are quarried in the vicinity of Des Moines. Other resources such as gravel, sand, peat, timber, fish, and wildlife also exist in the basin.

Regions 2, 3, and 5 are basically productive agricultural lands while Region 11, the central area of the basin, is more heavily populated.

The population for the basin, as a whole, has been increasing since before 1930. Some of the more rural areas, however, are experiencing a decline as migration to urban areas becomes more prevalent.

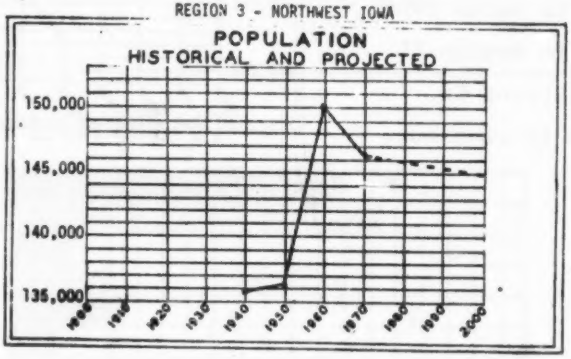
Kossouth County is a member of Region 2, population for the county has been declining since 1940 which is typical of the more rural areas of the basin.

REGION 2 - KOSSUTH COUNTY



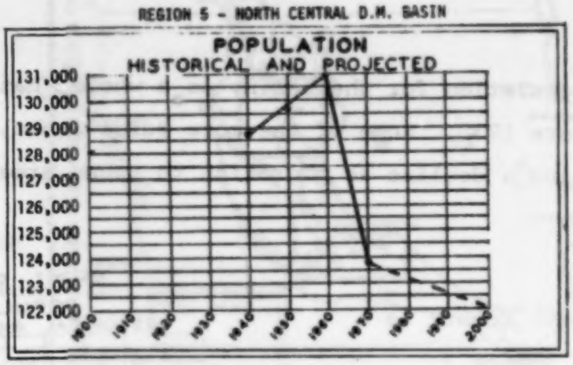
In the predominately rural area of Region 3, population increased from 1940 to 1960 with a dramatic increase from 1950 to 1960. Between 1960 and 1970, however, the Region experienced a decline in population which is expected to continue.

REGION 3 - NORTHWEST IOWA



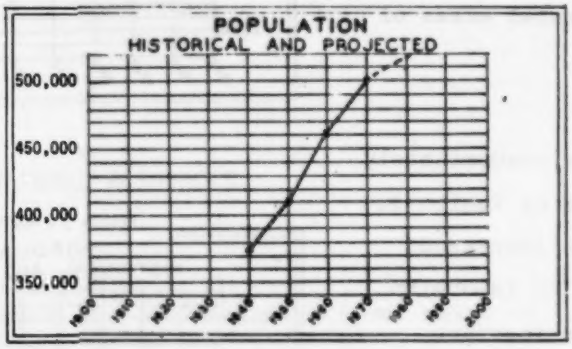
Population increased slightly in Region 5 from 1940 to 1960 but dropped significantly from 1960 to 1970. Every county in Region 5 experienced outmigration during the decade from 1960 to 1970. This trend of decrease in rural population is expected to continue.

REGION 5 - NORTH CENTRAL D.M. BASIN



Region 11 is the most heavily populated of the regions within the basin. There is a definite growth in urban population and a decline in rural population in Region 11 and this trend is expected to continue.

REGION 11 - SOUTH CENTRAL D.M. BASIN

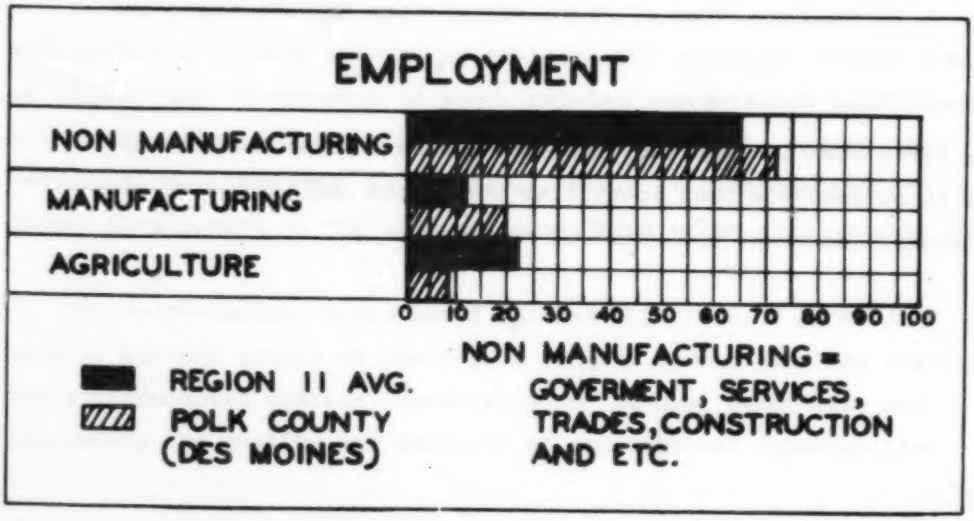


DEVELOPMENT AND ECONOMY

The economy of the basin is primarily centered on agricultural production but industrialization in the major population centers is rapidly increasing.

Per capita income of the regions within the basin vary from below to above the State of Iowa average of $2,894. The average of Kossuth County which is used to represent Region 2 is $2,464 and the average of Region 11, the more heavily urbanized area, is $2,933.

Because the area is more heavily urbanized, a more thorough analysis of the development and economy of Region 11 was made. The graph below compares the employment data for Region 11 with that of Polk County (Des Moines) and shows the greater concentration in activities other than agriculture for the urbanized area.



ECONOMIC PROJECTIONS

A review of population characteristics and projections provides data for general conclusions on economic projections.

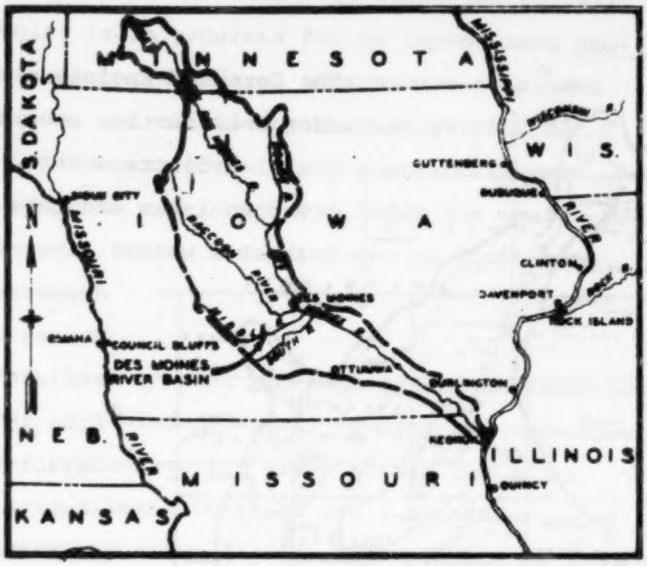
The availability of rural jobs is decreasing which results in a migration to urban localities. In Region 2, agriculture is expected to remain the major basic economic activity, but employment in this area is expected to decline. Population decline in Region 3 is expected to level off as the business and sales continue to increase. Businesses in Region 5 have decreased in number but have experienced an increase in sales. Region 11 is economically sound since it is and is expected to continue to be the economic hub of this section of the State.

PROBLEMS AND NEEDS

The first step in studying water and land resource problems of an area is an analysis that identifies the actual and potential problems, issues, concerns, and needs of the area.

BASIN CONCERNS

In this study of the Des Moines River Basin, the process of problem identification was first done on a regional basis.


MINNESOTA
S. DAKOTA
WIS.
MISSISSIPPI
WISCONSIN R.
GUTTENBERG
DUBUQUE
RIVER
IOWA
SIOUX CITY
MISSOURI
N
RACCOON RIVER
DES MOINES
CLINTON
ROCK R.
DAVENPORT
ROCK ISLAND
OMAHA
COUNCIL BLUFFS
SOUTH R.
DES MOINES RIVER BASIN
OTTUMWA
BURLINGTON
NEB.
KEOKUK
ILLINOIS
RIVER
MISSOURI
QUINCY
KANSAS

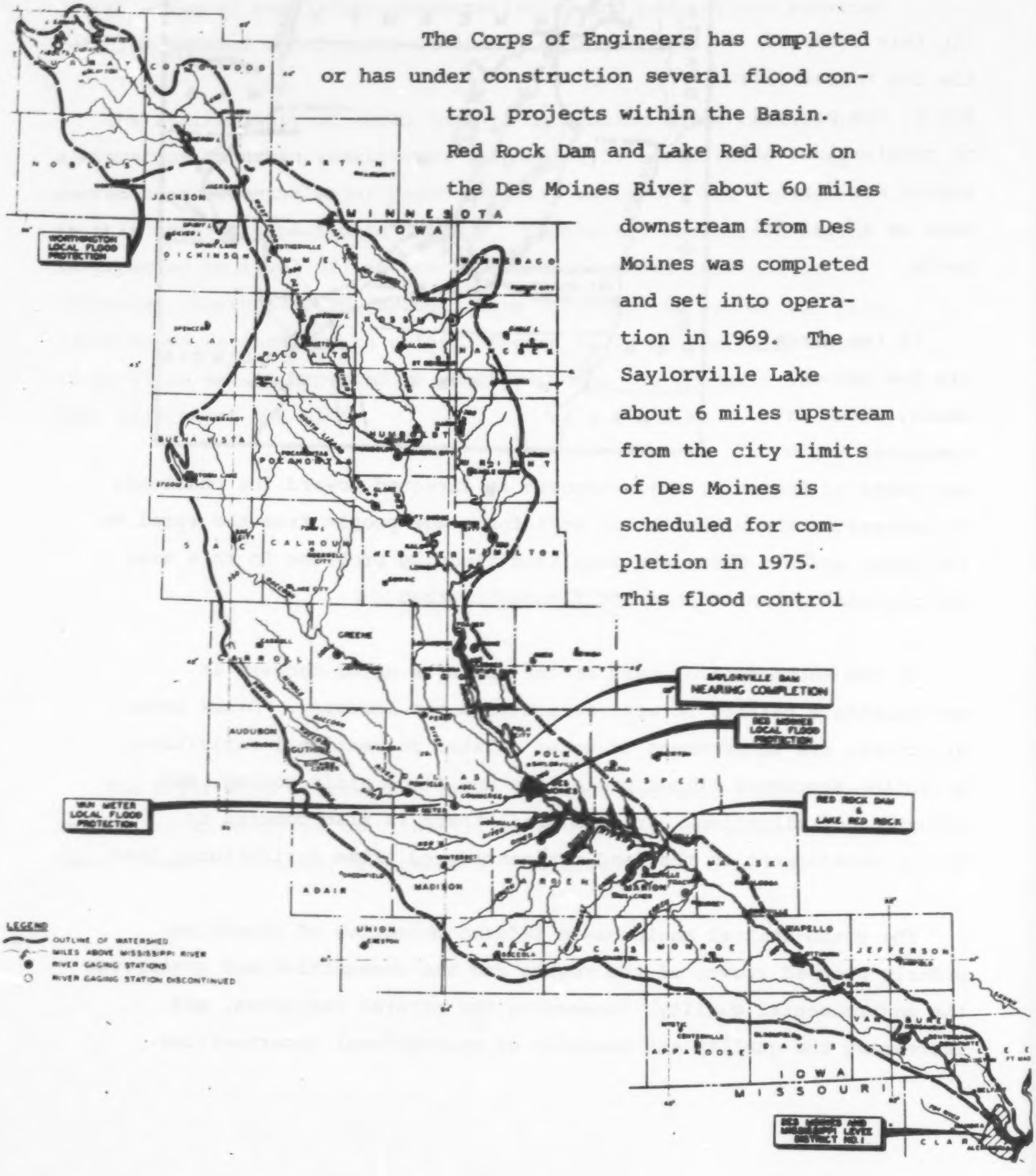
In the northern Des Moines Basin, which encompasses Region 3 and parts of Region 2, major concern is directed toward the challenge of decreasing the migration of work force age people from the rural to the urban areas. There are localized flooding problems in this area but regional attention has not focused on them.

In the north-central part of the basin, a major concern is maintaining a balance between agriculture and industry. Other areas of concern are enhancement of water related recreational activities, pollution abatement, flood protection and flood plain zoning, and reduction of siltation. In this area, there is also concern to direct development to the land not considered prime agricultural land.

The south-central basin has a defined objective of promoting orderly planned growth of the region and the communities and preserving the environmental quality, conserving the natural resources, and increasing the quality and quantity of recreational opportunities.

STATUS OF EXISTING PLANS AND IMPROVEMENTS

The Corps of Engineers has completed or has under construction several flood control projects within the Basin. Red Rock Dam and Lake Red Rock on the Des Moines River about 60 miles downstream from Des Moines was completed and set into operation in 1969. The Saylorville Lake about 6 miles upstream from the city limits of Des Moines is scheduled for completion in 1975. This flood control


WORTHINGTON LOCAL FLOOD PROTECTION
SAYLORVILLE DAM NEARING COMPLETION
DES MOINES LOCAL FLOOD PROTECTION
RED ROCK DAM & LAKE RED ROCK
VAN METER LOCAL FLOOD PROTECTION
DES MOINES AND MISSISSIPPI LEVEE DISTRICT NO. 1
MINNESOTA
IOWA
MISSOURI
NOBLES
JACKSON
COTTONWOOD
MARTIN
DICKINSON
EMMET
WINNEBAGO
KOSSUTH
HANCOCK
CLAY
PALO ALTO
BUENA VISTA
POCAHONTAS
HUMBOLDT
WRIGHT
SAC
CALHOUN
WEBSTER
HAMILTON
CARROLL
GREENE
BOONE
STORY
AUDUBON
GUTHRIE
DALLAS
POLK
JASPER
ADAIR
MADISON
WARREN
MARION
MAHASKA
UNION
CLARKE
LUCAS
MONROE
WAPELLO
JEFFERSON
APPANOOSE
DAVIS
VAN BUREN
LEGEND
OUTLINE OF WATERSHED
MILES ABOVE MISSISSIPPI RIVER
RIVER GAGING STATIONS
RIVER GAGING STATION DISCONTINUED

reservoir will supplement the capacity of Lake Red Rock. A local protection project for Des Moines, Iowa, was completed in 1971. Preconstruction planning is in progress for an improvement project at Ottumwa, Iowa, also. A Federal improvement completed in 1968 on the Des Moines and Mississippi Levee District No. 1 involved repair and improvement of existing district levees. Two local flood control projects were completed under the small project authority--one at Van Meter, Iowa, and one at Worthington, Minnesota.

In addition to the flood control projects either underway or completed by the Corps of Engineers, other Federal and non-Federal agencies have provided protection for areas within the basin. The Des Moines and Mississippi Levee District No. 1 maintains about 16 miles of levee protecting about 11,000 acres of fertile land in Clark County, Missouri. The 1.6 mile Parson's Levee District in Lee County, Iowa, protects about 232 acres of bottom land. The city of Ottumwa constructed levees and concrete walls to protect their flood plain. About 5.5 miles of levee have been constructed within the city limits of Des Moines by the city of Des Moines and the Works Progress Administration (WPA). There are more than 20 small projects along the Des Moines River between its mouth and Madrid, Iowa, which have resulted from many uncoordinated efforts. Many small works such as dikes, revetments, retards, dams, and diversion channels were constructed by or in cooperation with the WPA. A number of watershed projects are also in various stages of planning or construction by the Soil Conservation Service.

FLOOD PROBLEMS

Periodic flooding in the Des Moines River Basin has caused varying degrees of urban damage and crop loss. Flooding may occur from the Des Moines River itself or from its many tributary streams. Much of the damage is agricultural; however, a recent increase in the population of some urban communities indicates an increased usage of flood plain land and progressively higher damages from future flooding.

FLOODING CHARACTERISTICS

The more severe flooding occurs along the West Fork of the Des Moines River; on the Des Moines River downstream from Saylorville Damsite; on the Raccoon River in Polk, Dallas, and Greene Counties; on Beaver Creek in Polk and Dallas Counties; on Walnut Creek through the city of West Des Moines; on the Boone River at Webster City; and on Fourmile Creek in the city of Des Moines.

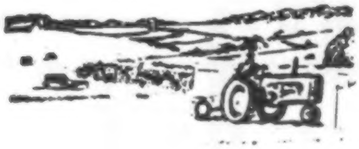
FLOOD HISTORY

There are 27 gaging stations on the streams within the Des Moines River Basin. Gage records and historical data indicate that major flooding occurs between May and July. Some rises occur in March and April, but they are not generally as severe as those in May, June, and July.

Before 1903, historical records and newspaper files provide the data on flood history. Major floods occurred in June 1851, June 1858, July 1875, April 1876, July 1881, April 1888, May 1892, April 1897, and July 1902. More recent flooding occurred in June 1903, June 1947, the spring of 1965, and April 1969. Basin wide, the floods of 1903 and 1947 were the most damaging.

FLOOD DAMAGE

Damage in the basin as a whole is basically agricultural. There are urbanized areas, however, which suffer significant damage from flooding. In both the urban and the rural areas, damage figures vary in magnitude. A flood may be very severe in one reach and quite moderate in another.



For the entire basin, average annual damage figures are estimated at $2,266,125 based on 1970 prices.

Saylorville and Red Rock projects and the Des Moines local protection project have helped reduce damage in the reach downstream from the city of Des Moines. Local protection projects at Eddyville and Ottumwa also give a high degree of security from flooding.

OTHER NEEDS

Other areas of concern to the Des Moines River Basin residents were also investigated in this study.

Commercial navigation on the Des Moines River is a remote possibility even though it is officially classified as a navigable waterway. Recreational boating, however, is continually increasing.

Municipal and industrial water supplies were also investigated. This study indicated that by 2020, only one municipality, Worthington, Minnesota, is expected to have a water supply problem. The city of Winterset is also concerned with a projected water shortage and have requested the Corps to study furnishing an alternate source of water.

Water quality and waste disposal is also a concern in the basin. Industrial waste makes up over 75 percent of the total organic waste discharged into the basin streams. This heavy waste load causes water quality problems in many areas. Water quality problems also exist as a result of poor agricultural practices in many areas.

Irrigation is not a major concern in the basin but was given consideration since some of the higher-valued crops in the upper Des Moines and Raccoon River basins are irrigated.

Recreational development is a definite need in the Des Moines River Basin. Any projects which are developed as a result of this study will include possible recreational development facilities.

Erosion and sediment problems were also considered in this study. Gully erosion is the most significant erosion problem in the basin.

IMPROVEMENTS DESIRED

At the first of five public hearings held as a part of this study, local interests indicated major concerns to be flooding along the Des Moines River, East Fork Des Moines River, West Fork Des Moines River, Boone River, Raccoon River, Walnut Creek and Lizard Creek. Also, a small unnamed stream had caused damage at Van Meter, Iowa.

Several of the residents favored a reservoir on the Raccoon River above Jefferson. Small detention reservoirs were also mentioned as a consideration to alleviate or reduce flooding.

Three public hearings were held in June 1970. One was held primarily to consider the construction of the Jefferson Reservoir. The second public meeting centered on investigations for flood control and other purposes in the upper reaches of the Basin. The third meeting was held at West Des Moines to describe and receive comments on the improvements proposed in the Des Moines metropolitan area.

Between 1970 and 1974 all but one of the proposed improvements were eliminated from further study by the completion of separate investigations or by events which made the measures infeasible.

A public meeting was held in May 1975 at West Des Moines to discuss the results of the feasibility study on the remaining improvement. In general, both verbal and written support of the plan was given at the meeting.

FORMULATING A PLAN

Plan formulation is a repetive process designed to identify and evaluate all possible solutions. Its goal is to select the most feasible of those alternatives. Both principles and standards of analysis based on law, policy, and sound professional practice govern the plan formulation process.

The primary goal of the plan formulation has dual objectives:

* To find an economically justified project or program which solves the existing problems and needs of the area and its residents.

* To modify all economically feasible plans to find a plan that minimizes the adverse environmental effects or enhances the environmental quality of the area.

These objectives must be met and an effort made to improve the regional development of the area and to enhance the social well-being of the area's residents.

FORMULATION EVALUATION AND CRITERIA

Basic concepts govern the planning process and the formulation stage of this study. There are three planning stages. Each stage has four basic activities--problem identification, formulation of alternatives, impact assessment, and evaluation; and each stage increases in detail. Certain standards, principles, and criteria allow a logical progression through the decision making process and provide units of measurement for comparing the accomplishments and effects of the alternatives.

The prinicples are derived from several sources. Basically, they require a recommended plan to have benefits which exceed the costs. The principles require that a recommended plan meet two equal objectives for planning the use of water and related land resources of the United States--enhancement of the national economic development and enhancement of the environmental quality. The library of laws established by Congress also serves as a guide in comparing the alternatives.

Standards result from three sources--Corps of Engineers directives, sound professional practice, and the Water Resources Council Principles and Standards.

Criteria which enable decisions to be made on reliable facts include technical, environmental, economic, and other related evaluation measurements.

Technical criteria is of both a general and specific nature. General technical criteria applies to any project and requires that the plan must be technically feasible to implement, must be practical using existing technology, must comply with policy, design criteria, and technical assumptions.

In general, economic criteria requires the average annual benefits to exceed average annual charges, except for certain environmentally related instances. Environmental criteria require that consideration be given to the preservation or enhancement of environmental resources as an equal objective with the national economic development. Other criteria include the requirement that plan formulation be compatible with existing or proposed programs of State and local interests. The plan must be acceptable to the public and must not be a duplication of any efforts by other Federal agencies.

PLANNING OBJECTIVES--DES MOINES RIVER BASIN

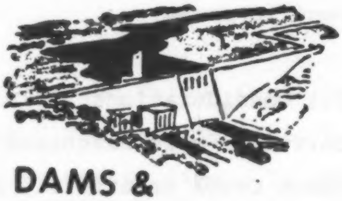
In addition to the overall planning objectives of enhancing the National Economic Development; and the Environmental Quality, specific objectives were identified for the Des Moines River Basin. These reflected the objectives of local, State, and regional interests as well as the Nation as a whole and included flood damage reduction, water and land related recreation opportunities, reservoir storage for municipal water supplies, improved water quality of the Des Moines River and tributary streams, and preservation of the open space areas along the river and its tributary streams.

POSSIBLE SOLUTIONS

Initial investigations of the Des Moines River Basin included consideration of potential damsites, channel conditions, and areas where concentrated damages occurred. Other water related needs of the basin were considered as they relate to flood damage reduction.

Possible solutions considered within the basin included both structural and nonstructural alternatives.

Structural alternatives included reservoirs at numerous sites on the main stem above Saylorville Lake and on tributary streams downstream from Red Rock Dam. A multipurpose reservoir was considered at Fort Dodge, Iowa, a small reservoir was considered for two branches of Lizard Creek, a potential damsite was studied on the West Fork Des Moines River, and a damsite was considered at Tunnel Mill on the Boone River. A preliminary study was made of a flood control dam on Whitebreast Creek about 9 miles southeast of Osceola. A detention reservoir on Beaver Creek and reservoirs on some of its tributaries were considered in a cooperative study with the Soil Conservation Service. A reservoir on Walnut Creek and a local protection project along the downstream reach of the creek



DAMS & RESERVOIRS

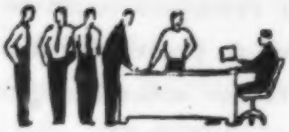
was also proposed. Two sites were considered for the Walnut Creek reservoir. Three reservoir sites were investigated for the Raccoon River--two on the main stem and one on the South Raccoon at Van Meter. Dams for flood control were considered for North, Middle and South Rivers.

In addition to the reservoir projects, local flood protection projects were considered for many of the flood prone communities within the basin. Protection projects were considered for Fort Dodge and Lehigh. Flooding at Webster City on the Boone River was also investigated. A rural reach on the West Fork Des Moines River was also considered and flood problems at Jackson and Windom, Minnesota, and Estherville, Iowa, were also considered under a small projects authority. On the Raccoon River, local protection was considered for Adel, Guthrie Center, and Van Meter. Fourmile Creek was also considered for upstream reservoirs, channel improvements, and local projects for specific areas.

LEVEES

Nonstructural considerations included several alternatives. Environmental corridors were discussed for areas downstream from the proposed Walnut Creek Reservoir. A Des Moines River environmental corridor was considered downstream of Saylorville Lake. Nonstructural plans also considered flood forecasting and warning systems, flood plain evacuation, flood proofing, and flood plain management, including designated floodways and encroachment lines, zoning and subdivision regulations, and flood plain information reports.

ALTERNATIVES CONSIDERED FURTHER



Six of the possible solutions were given further evaluation and consideration--Jefferson Reservoir; Walnut Creek Reservoir; West Des Moines and Des Moines, Iowa, at Walnut Creek Local Protection project; Des Moines, Iowa, on Fourmile Creek Local Protection; Walnut Creek Environmental Corridor; and Des Moines River Environmental Corridor.

* JEFFERSON RESERVOIR--The proposed damsite would be in Greene County, Iowa, on the Raccoon River about 100 miles above its mouth and about 10 river miles above Jefferson, Iowa. Based on 1970 values, construction of the earth dam would have an average annual cost of $1,662,000 and would result in an average annual benefit of $2,225,600. The benefit-to-cost ratio of this plan was 1.34. An environmental enhancement program was included and full recreational development planned.

* WALNUT CREEK RESERVOIR--The proposed Walnut Creek Reservoir was in Dallas County on Walnut Creek. The damsite would be about 0.1 mile upstream from the Polk-Dallas County line. In addition to the flood control, the reservoir would also involve fish and wildlife conservation and recreational development. Average annual benefits expected from this reservoir were $457,000 and average annual costs of the project were estimated to be $440,600. The benefit-to-cost ratio of this plan was 1.04.

* FLOOD DAMAGE REDUCTION AT WEST DES MOINES AND DES MOINES, IOWA, ALONG THE RACCOON RIVER, WALNUT CREEK, AND JORDAN CREEK--This plan of improvement would provide protection against coincidental

flooding of the Raccoon River and Walnut Creek and Jordan Creek. The plan involved new and improved levees along the left bank of Jordan Creek, the left bank of the Raccoon River, and along the right bank of Walnut Creek, road ramps, closure structures, and pumping stations. Three feet of freeboard would be provided under this plan. Consideration was given to preserving and enhancing the appearance of the waterfront and affected areas along both streams. Based on 1970 values costs were estimated at $138,500, and average annual benefits anticipated from this plan of improvement were estimated at $207,500, resulting in a benefit-to-cost ratio of 1.50.

* FLOOD DAMAGE REDUCTION AT DES MOINES, IOWA, ALONG FOURMILE CREEK--The plan of protection involved levees along both banks of Fourmile Creek, and would protect about 375 residential and commercial properties.

* DES MOINES RIVER ENVIRONMENTAL CORRIDOR--This project as formulated in 1970 would provide additional flexibility in the operation of the Saylorville Lake Project on the Des Moines River. Buying corridor lands in a reach about 7 miles extending to the city limits of Des Moines would control the use of this land and permit operation of reservoir regulation plans without causing damages.

* WALNUT CREEK ENVIRONMENTAL CORRIDOR--This project would mitigate the loss of wildlife habitat that would occur from developing Walnut Creek Reservoir. It involves purchasing land between the Walnut Creek damsite and the city of Clive. Based on 1970 values, average annual benefits of the project would be $91,000 and average annual costs would be $51,700. The benefit-to-cost ratio of this plan is 1.8.

SELECTING A PLAN

Because of the length of time involved in this study, several of the alternatives were eliminated from further consideration by completion of separate studies or projects implemented as a result of these studies. Only the West Des Moines and Des Moines Local Protection Project remained for recommendation. The remaining plans were eliminated for a variety of reasons.

* FLOOD DAMAGE REDUCTION AT DES MOINES, IOWA, ALONG FOURMILE CREEK--The City of Des Moines requested a separate study be made of this flood problem under a special small project authority available to the Corps of Engineers. A Detailed Project Report was prepared on this study. And, as a result, Fourmile Creek was no longer considered in the scope of this study.

* DES MOINES RIVER ENVIRONMENTAL CORRIDOR--This is currently being considered as a modification to the Saylorville Lake Project and is being coordinated with the State of Iowa, Polk County, and the city of Des Moines.

* WALNUT CREEK AND JEFFERSON RESERVOIRS--Local cooperating sponsors for both of these have indicated a lack of financial capability and/or interest in the recreation cost-sharing involved in the plans. Water quality storage at Jefferson Reservoir is not justified under current Federal policy. As a result, further consideration has been discontinued.

* WALNUT CREEK ENVIRONMENTAL CORRIDOR--The lack of interest in the reservoir also resulted in a lack of a local sponsor for the environmental corridor plan.

* FLOOD DAMAGE REDUCTION AT WEST DES MOINES AND DES MOINES, IOWA, ALONG THE RACCOON RIVER, WALNUT CREEK, AND JORDAN CREEK--The local flood protection project for West Des Moines and Des Moines, Iowa, at Walnut Creek is the remaining plan. The plan is selected to be recommended for implementation. The plan, as selected, reflects the infeasibility of the Jefferson and Walnut Creek Reservoirs and current needs of the community.

THE SELECTED PLAN

The plan of improvement for West Des Moines and a small area of Des Moines would provide protection against the Standard Project Flood on the Raccoon River, Walnut Creek, and Jordan Creek. The Standard Project Flood may be expected from the most severe combination of meteorlogical and hydrological conditions that are reasonably characteristic of the geographical area, excluding extremely rare events.

Because the report has discussed the basin and has not presented detailed data on the West Des Moines-Des Moines area, an outline of the resources and economy, problems and needs, planning objectives, and possible solutions considered for the area is given before the selected plan is described.

RESOURCES AND ECONOMY--WEST DES MOINES/DES MOINES

The resources and economy of the area are discussed through a breakdown of the environmental setting, the natural resources, and the human resources of the area.

ENVIRONMENTAL SETTING AND NATURAL RESOURCES

Land is characterized by extensive glacial deposits. The project area environment is highly urbanized and predominant land use is for residential, commercial, and industrial development. Agriculture is a secondary use.

Walnut Creek is a major tributary of the Raccoon River but it has a relatively small flood plain.

The average temperature for the year is 50 degrees F. The growing season averages 171 days. Annual precipitation averages 31 inches with the most rain occurring in May and June and the least occurring in January and February. Air quality in the area is near standard and water quality appears to be fair to good.

The historical background of the area is not well documented, although one site in the surrounding area has been entered in the National Register of Historical Places. Several sites of architectural interest were identified on the Iowa Inventory of Historic Places. A preliminary archaeological search of the area was made to locate significant sites but no new sites were discovered. Although no sites have been found in the immediate study area, a previously recorded site nearby indicates the possibility of sites within the area.

The general vegetation of the area has been greatly altered by man. Two wooded areas--Brown's Woods and Denman Woods--are some of the remaining native woodlands of the area. These woods encompass 2,054 acres of habitat area and serve a great number of species. Except for American Elm, the wooded areas have a healthy stand of trees typical of the Midwest. The flood plain understory is generally open and parklike. Areas along the existing Walnut Creek levee, however, have little understory.

Denman Woods supports a larger terrestrial and arboreal animal population per acre than any other habitat in the area. Except for insects, birds are the most abundant form of animal life within the project area and bird watching and photography is a popular pastime in the area. Mammals are well distributed but there are few species. Mink, raccoon, deer, beaver, muskrat, foxes, and skunks, are among the animals found in the area. Cottontails, moles, gophers, ground squirrels and mice also exist in the area although they are highly vulnerable to flooding and are more prominent at higher elevations. There are about 58 species of warm water fish in the Lower Raccoon River System. Much fishing is done along the Lower Raccoon River, the adjacent gravel pit lakes and Walnut Creek. Fishing, however, is more sporadic in Walnut Creek because of low water

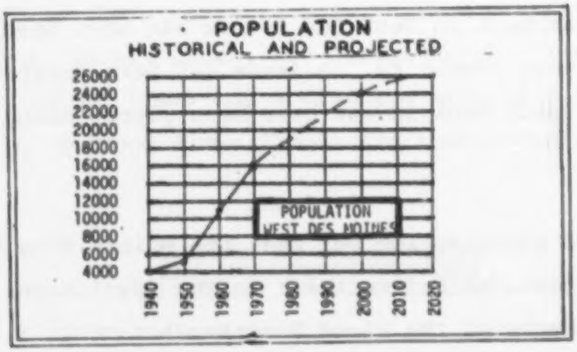
much of the year. Fishing also occurs in the easternmost gravel-pit lakes.

One bird, the Brown Pelican, and two fish species, the black nose shiner and the western sand darter, which are considered "rare" are found in the West Des Moines-Des Moines area.

Recreation opportunities are numerous and diverse. The Raccoon River, Walnut Creek, and the gravel pit lakes, as well as over 1,500 acres in three city parks provide a wide range of recreation activities; hiking, nature study, bicycling, picnicking, trail biking, canoeing, horseback riding, and tennis, to name a few.

HUMAN RESOURCES

The 1970 population for West Des Moines was 16,441. This figure is projected to reach 28,000 by 2020.



Projects for the Des Moines, Iowa, Standard Metropolitan Statistical Area (SMSA) indicated an anticipated population of

451,000 for the SMSA by 2020. This projection reflects greater growth rates for the towns surrounding Des Moines than for Des Moines itself.

The population in the flood plain is generally older than that of the surrounding city. Manufacturing employs 19 percent of the labor force. Median income for West Des Moines was $13,408 in 1969. Based on the value of the homes, the population of the flood plain has a substantially lower income level. Average value of homes in West Des Moines was $23,500 while the average value of homes in the flood plain was $11,000.

PROBLEMS AND NEEDS

STATUS OF EXISTING PLANS AND IMPROVEMENTS

Existing flood protection measures in the area include structural and temporary measures used by the cities of Des Moines and West Des Moines. A railroad embankment in West Des Moines has been used to provide protection for that community. A levee has been constructed along Walnut Creek and spoil bank levees have been placed along Jordan Creek.

Des Moines has flood plain zoning but West Des Moines does not. Both cities will be required to refine their zoning regulations to comply with the requirements of the Flood Disaster Act of 1973 (PL 93-234). Both cities have applied for flood plain insurance, and both have been declared eligible. To comply with the Federal Insurance Administration rules and regulations, future new or replacement development must be flood proofed to the 100-year frequency flood elevation (flood with a one percent chance of being equalled or exceeded in any given year). This requirement will probably halt new development within the majority of the flood plain area.

The National Weather Service provides their flood warning and forecasting service for the entire Upper Mississippi River Basin and has a Des Moines River District Office.

Several bridges cross Walnut Creek, Jordan Creek, and the Raccoon River in the study area.

Another flood control measure in the area is a storm water ponding area and a paved channel constructed through a cement producing firm which was built to control flows of Fairmeadow Creek.

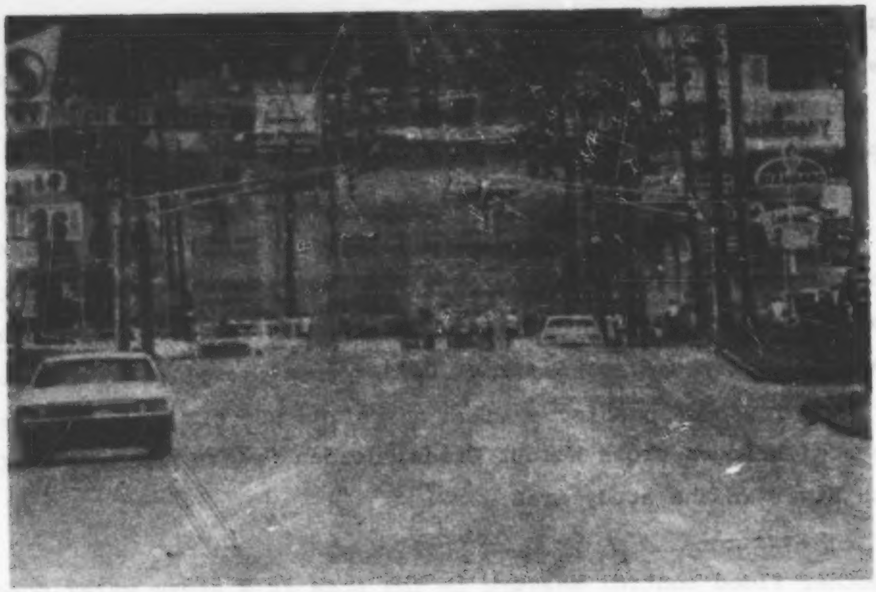
FLOOD PROBLEMS

Flooding of the study area results from overflow from the Raccoon River, Walnut Creek, and Jordan Creek. The Raccoon River above Walnut Creek has a drainage area of 3,535 square miles. Major Raccoon River floods are summarized on table 1.

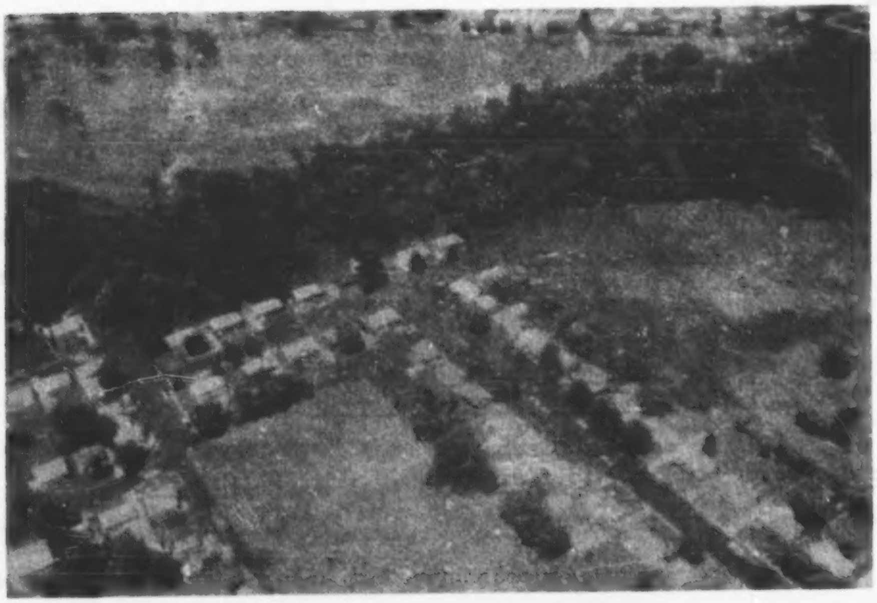
Table 1

SUMMARY OF MAJOR FLOODS
RACCOON RIVER AT VAN METER

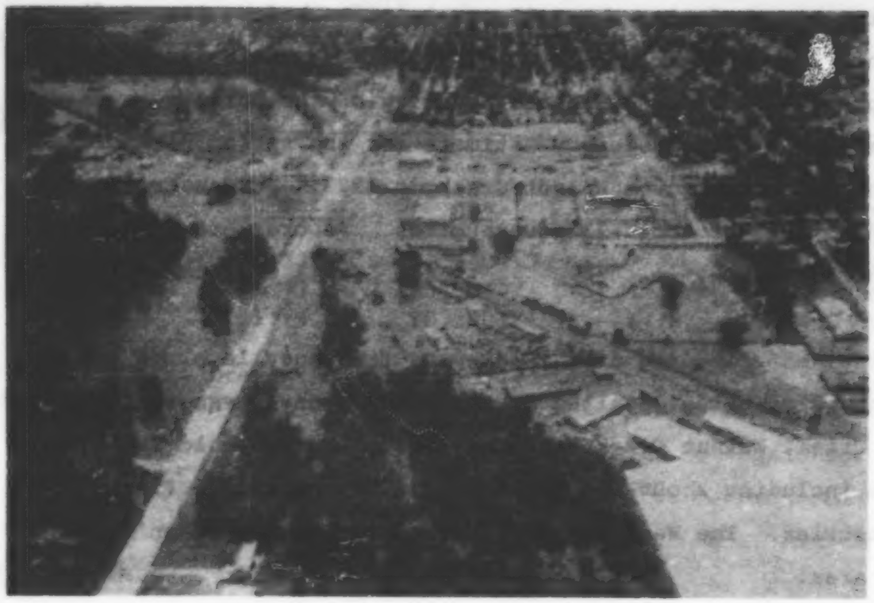
Order of Magnitude	Peak Discharge c.f.s.	Year of Crest
1	41,200	1947
2	35,600	1973
3	35,200	1917
4	35,200	1958
5	32,300	1960
6	32,000	1926



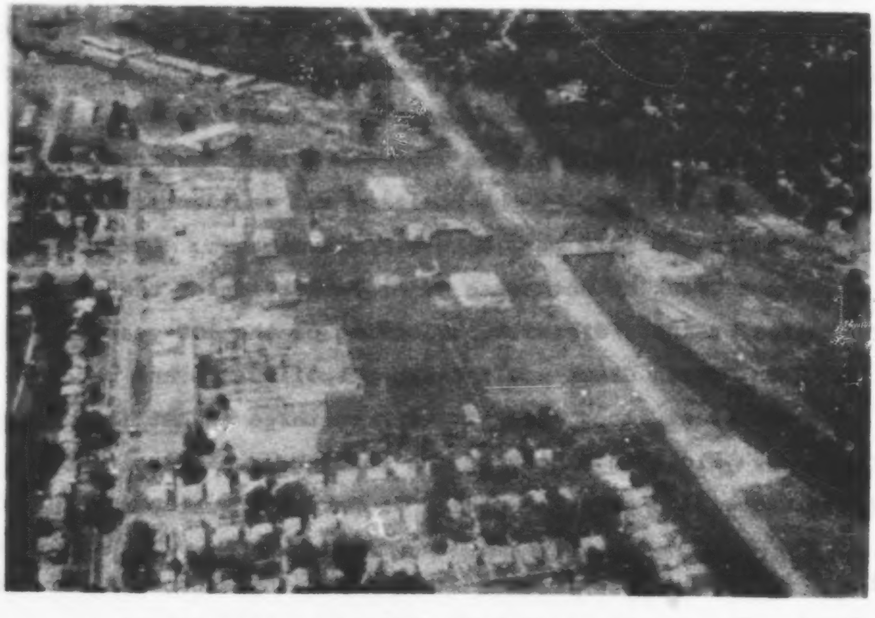
WEST DES MOINES, IOWA, WALNUT CREEK FLOOD, 1973
View near 4th Street looking East along Grand Avenue



WEST DES MOINES, IOWA, WALNUT CREEK FLOOD, 1973
View just North of North Valley Drive looking Northeast



WEST DES MOINES, IOWA, WALNUT CREEK FLOOD, 1973
View near 63rd Street North of Grand Avenue
looking South along 63rd Street



WEST DES MOINES, IOWA, WALNUT CREEK FLOOD, 1973
View Southwest of intersection of 63rd Street and Grand Avenue
looking North generally along 63rd Street

Walnut Creek drains about 85 square miles before its confluence with the Raccoon River. Records of flooding on this stream were not kept until 1971 so synthetic hydrologic procedures were used to establish a flow frequency estimate for the stream. Major flooding was recorded on Walnut Creek in 1973. Jordan Creek has a drainage area of about 13 square miles. Records are not available for this stream either.

Coincident flooding of the 100-year frequency level (a one percent chance of being equalled or exceeded in any given year) on Jordan Creek, Walnut Creek, and the Raccoon River would inundate an area including about 925 residences, 150 commercial firms, and 25 industries. The West Des Moines Municipal Water Plant is also in the area.

A flood hazard analysis of the Raccoon River indicates that floods greater than the 25-year frequency flood would cause widespread damage to the major business district of West Des Moines and surrounding industrial and residential areas. The primary flood hazard along Walnut Creek is along the right bank where the 100-year flood would inundate the commercial and industrial area between Center Street and Grand Avenue and also inundate residential areas of Des Moines and West Des Moines downstream of Grand Avenue. A portion of the business and residential area at Grand Avenue on the left bank also suffers damages. Large floods on Walnut Creek do not cause major inundation of the major West Des Moines business district. Flooding of the 100-year frequency level on Jordan Creek would overtop spoil banks and cause damage to development along the left bank to three industries along the right bank. Flows in excess of the ponding area capacity on Fairmeadows Creek also causes flooding in parts of West Des Moines.

Table 2 shows historical flood damages for the Raccoon River and Walnut Creek. The amounts have been updated to 1975 prices.

Table 2

FLOOD DAMAGES

Flood	Raccoon River		Walnut Creek	
	Gage at Van Meter	Damages	USGS Gage at 63rd Street Des Moines	Damages
June 1947	21.37	$ 151,800	2/	$ 779,600
July 1958	21.77	85,500 1/	2/	561,300
July 1973	21.74	55,200 1/	17.72	792,500

1/ Flood fighting prevented major flood damage.
2/ The Walnut Creek gage did not exist at the time of these floods.

RECREATION NEEDS

Additional opportunities for outdoor recreation are needed in West Des Moines, particularly improved access for fishing, boating, and canoeing. There is also a need for a connecting link between Denman Woods and Browns Woods and between the Des Moines bicycle trails and bridle paths with the levee section along Walnut Creek. More ball parks and playgrounds could also be used near the proposed levee alignment. A report prepared by the Central Iowa Regional Planning Commission also recommended recreational development indicating the greatest need for recreational land in Polk County to be for natural environment lands.

IMPROVEMENTS DESIRED

Flood protection is the basic improvement desired. City officials and occupants of the flood plain are anxious to eliminate the costs and the uncertainties associated with potential flooding. A recreation plan compatible with flood reduction measures is also desired by city officials.

FORMULATING A PLAN

Formulation and evaluation concepts for the West Des Moines--Des Moines area were the same as for the Des Moines River Basin. Specific objectives were to reduce flood damages along areas of the Raccoon River, Walnut Creek, and Jordan Creek, to preserve and enhance open space and recreation opportunities, and to preserve historical and archaeological sites in the flood plain.

FLOODWAY DETERMINATION

Before the alternative measures could be evaluated, an analysis was made of a floodway and floodway fringe area along the three streams. The floodway is that part of the stream channel and adjoining flood plain that can convey a 100-year frequency flood (flood with a 1 percent chance of occurring in any given year) confined by hypothetical levees on each bank and cause increases in stages less than 1 foot above the stage the same flood would reach under existing conditions. The floodway fringe is the land between the floodway and the outer limits of the flood plain. This process is required as a part of the Federal Flood Insurance Program.

POSSIBLE SOLUTIONS

Three general categories of alternatives were considered--structural plans, nonstructural plans, and the possibilitiy that no additional action would be taken. Alternatives were first screened for their physical, political, financial, institutional, economic, and environmental feasibility. Alternatives meeting these requirements were compared with each other to reduce the possible solutions considered in selecting a plan for recommendation.

The "No Additional Action" Alternative must be considered although it does not solve any of the area's problems or needs. It does serve as a comparison for the other alternatives. The "No Additional Action" alternative assumes that the cities will not undertake major structural (levees) or nonstructural (flood proofing, evacuation) measures, to reduce flood damages. It considers flood plain regulation, flood insurance, a flood warning system, and emergency flood fighting measures as a part of the existing conditions that would remain without any further action.

* Both Des Moines and West Des Moines are enrolled in the emergency flood insurance program administered by the Federal Insurance Administration (HUD). The "No Additional Action" alternative assumes that the cities will remain in the program. The flood insurance program distributes costs over a wider area but does not actually reduce damages. The average annual damages of $803,000 would remain under this alternative.

* Flood plain regulation will prevent future development in the floodway and require future development to be above or flood

proofed to the 100-year frequency level. These restrictions would have an adverse effect on the tax base of the community and the area while average annual damages of about $803,000 would remain.

* Flood forecasting and warning systems are available but do not provide sufficient protection in the study area. While they allow time for emergency preparations and temporary evacuation, they do little to reduce damages. In addition, community disruption, anxiety, and worry during flooding also continues.

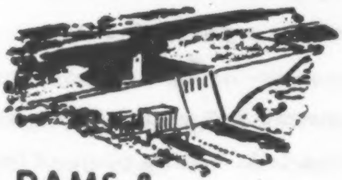
Nonstructural Considerations include flood plain evacuation and a combination of flood proofing and evacuation.

* Flood plain evacuation was considered but not extensively because the costs to evacuate over 925 residences, 150 commercial firms, and 25 industries would be excessive. Estimated tangible costs would be about $50 million. Disrupting the affected families would also cause adverse social stress. Possible adverse environmental impacts involved in the area to which the structures were relocated would also be a negative factor.

* Combined flood proofing and evacuation would have basically the same effects as evacuation. Costs would be excessive--over $35 million. Social impacts would involve loss in community cohesion and stability and a potential health and safety hazard would remain for the people not evacuated. Environmental considerations were also similar to those of evacuation.

Structural Solutions included reservoirs, levees and floodwalls, and channel and bridge modifications.

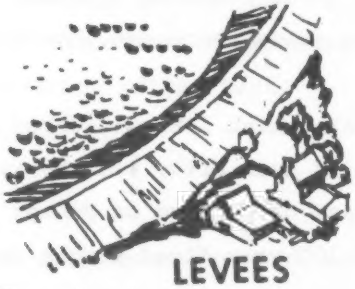
* Reservoirs for the area upstream were considered, but the two sites considered--one on the Raccoon River and one on Walnut Creek--were not justified. Upstream reservoirs would have to be supplemented by other resources at the West Des Moines--Des Moines area because the damsites are too far upstream of the area to effect significant reductions in the flood profiles.



DAMS & RESERVOIRS

* Levees and floodwalls were also evaluated. Three levee alignments were considered to protect existing development. Because of their expense, floodwalls were considered only where levees were infeasible.

Levee Alignment 1 extends from high ground along the left bank of Jordan Creek to the confluence of the creek with the Raccoon River and then along the south side of the C.R.I.&P. Railroad, then following the existing levee to a point along 63rd Street. This alignment is landward of the existing levee along Walnut Creek at North Valley Drive. Between the point along 63rd Street where the existing levee ends and the Interstate 235 embankment, five alternatives were considered.



LEVEES

(1) Alignment 1-A follows a preliminary encroachment limit and would not increase stages of the 100-year flood more than 1 foot. It would require two closure structures, a road ramp and railroad track raise, and a sandbag closure. The plan appeared to be feasible, to have minimal environmental effects, and to warrant further consideration. A recreation plan consisting of bicycle paths, fishing piers, a boat ramp, and a small park in West Des Moines was formulated as a part of 1-A.

(2) Alignment 1-B would cross 63rd Street upstream of Grand Avenue and join 1-A. This plan offered no more protection than 1-A but had a greater cost and was dropped from further consideration.

(3) Alignment 1-C incorporated a portion of Hoak Drive into the line of protection but was not considered further because of a 9 to 10-foot road raise that would be required which would adversely affect entrances to three businesses.

(4) Alignment 1-D considered extending 1-A around a concrete ready-mix plant. Adequate access for truck traffic made the cost of this alternative too great, however, and it was also rejected.

(5) Alignment 1-E considered protecting three businesses on the east side of Hoak Drive and the ready-mix plant and commercial firms upstream and downstream of Center Street. This plan would have increased 100-year flood stages in a residential area on the opposite bank which would require costly mitigative measures making the costs of the plan excessive. A channel modification plan to compliment Alignment 1-E was also considered. It would lower flood stages associated with the alignment and was considered instead of providing a levee around a residential area on the left bank of Walnut Creek. Property owners supported this plan and hydraulic computations showed that it could result in a 100-year

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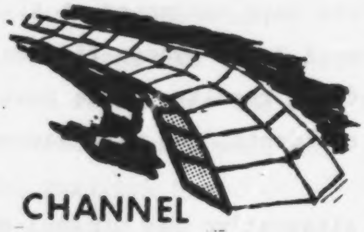
water surface profile equal to the existing condition profile. However, even without including such expenses as rights-of-way and severance damage, the average annual cost of this plan far exceeded benefits that would result. Alignment 1-E is strongly supported by local property owners along Hoak Drive, however, and is also carried forward for further consideration as a variation to alignment 1-A.

Levee Alignment 2 considered protection for seven commercial firms and four residences along the left bank of Walnut Creek in the vicinity of Grand Avenue. Cost of this plan was estimated to be $910,000, excluding right-of-way. Average annual costs are estimated at $53,635. Benefits were $26,400 and the resulting benefit-to-cost ratio was 0.5 which did not warrant further consideration.

Levee Alignment 3 considered protection of an industrial park along the right bank of Jordan Creek and the left bank of the Raccoon River. Cost of the plan was $500,000, excluding rights-of-way and drainage facilities. Average annual cost is $29,470. With benefits of only $500, the benefit-to-cost ratio of 0.02 does not warrant further consideration of the plan.

Channel and Bridge Modifications are considered when the cost of the modifications is less than the cost saving realized by reducing the required height of other measures such as levees. Channel modification along the Raccoon River was not considered further because of the extensive adverse effect that would result to the environment, particularly to Denman Woods and Brown's Woods.



Two bridges on Walnut Creek cause problems, however--the Grand Avenue Bridge and the Chicago, Milwaukee, St. Paul, and Pacific Railroad Bridge. Hydraulic computations indicate that levee heights could be reduced between Grand Avenue and 63rd Street by bridge and channel modifications. Further analysis, however, indicates costs would exceed $1,000,000 while the estimated net savings in levee costs would be $100,000. This wide margin between the two costs resulted in these modifications being eliminated from further study.

Walnut Creek modifications upstream of 63rd Street were considered and eliminated from further study as a part of levee alignment considerations. Downstream of Grand Avenue, the severe adverse impacts on the natural stream environment and the proposed recreational activities, as well as the high cost of channel modifications, eliminated this alternative from further study.

ALTERNATIVES CONSIDERED FURTHER

Only the levee and floodwall alternative including a recreation plan and the no additional action plan remained for further consideration.

A combination of Alignment 1 plus 1-A resulted in an economically justified benefit-to-cost ratio. Costs were estimated at $495,467 and benefits were estimated at $1,168,900 which result in a benefit-cost ratio of 2.36. These figures include recreation costs and benefits. Because of the results of the preliminary analysis and its acceptability of local residents, the plan was carried forward for further consideration.

This alternative has minimal adverse environmental effects, would help preserve significant architectural resources, and would provide additional recreational opportunities. Eliminating the flood threat would allow redevelopment of the West Des Moines downtown area and would relieve flood plain residents from the anxieties associated with flooding. Levee alignments 1 and 1-A would exclude other areas from protection and about $37,700 in average annual flood damages would continue. No economically feasible means to reduce this damage was available. Concerned interests in these unprotected areas have requested that consideration be given to realignment of the levee to include protection for their properties. Further evaluations of protection for these areas will be made in the post authorization, Phase I General Design Memorandum studies.

The "No Additional Action" alternative offers no solutions to the problems of West Des Moines and Des Moines but is carried for further consideration as a basis for comparison with the other alternative. Average annual damages of $803,000 would continue although implementation of zoning regulations could prevent additional damages. Anxieties associated with the flood hazard would also continue, as would the money and time involved in flood fighting, cleanup, and restoration of flood damaged properties.

COMPARISON OF ALTERNATIVES

Levee Alignment 1 plus 1-A meets the economic objectives and criteria established and is designated as the NED (National Economic Development) alternative. It also represents the plan which would involve the least adverse environmental impact and is considered to be the EQ (Environmental Quality) Plan.

Table 3 compares the plans.

TABLE 3

SYSTEM OF ACCOUNTS - SUMMARY COMPARISON OF ALTERNATIVES

	Levee and Floodwall Plan NED & EQ PLAN	No Additional Action
1. Plan Data		
Structures	Levees, floodwalls, roadramps, pump stations, and interior drainage facilities.	Emergency evacuation, floodfighting, flood insurance, regulatory control of flood plain use, flood disaster relief.
Right-of-way requirements and borrow areas	186 acres total	0
2. NED (Avg Ann $1000)		
Beneficial	1,168.9	0
Adverse	495.5	1,151.8
Net	673.4	-1,151.8
3. Environmental Quality		
Aesthetic values	Loss of view and access to Walnut Creek.	Unaffected
Biological resources - Woodlands	Loss of 22 acres of creek bottom land timber along Walnut Creek.	Unaffected
Water quality	Temporary degradation during construction.	Unaffected
Air quality	Temporary degradation during construction.	Unaffected
Archaeological resources	Possible destruction of unidentified sites during construction.	Possible destruction of sites by non-public commercial or agricultural use.
4. Regional Development		
Project area	Beneficial; increase toward stability. Will provide opportunity for new development to locate in flood fringe area.	Adverse; continued flood hazard and flood plain regulations will probably halt location of new development in flood fringe area.
5. Social Well-Being		
Flood risk	Reduction of hazard to life and property in protected area.	Continued hazard to life and property.
Public health	Reduction in floodwater pollution hazard in protected area.	Continued hazard to health with flooding of water plant.
Public utility facilities and services	Sewers, water, and other public utilities and services would continue during floods.	Interruption of sewer, water, and other public utilities and emergency service would occur with floods.
Community cohesion	Probable stabilization or increase in flood plain population and community ties. Possible alienation of unprotected areas.	Continued potential to decline in flood plain population and disruption of community and family ties.

SELECTING A PLAN

The structural system of levees and floodwalls (Alignment 1 and 1-A) meets the needs of the community and the criteria established for Federal recommendation and participation. It is acceptable and supported by the cities involved, the majority of the residents, and local, State, and Federal agencies and is selected for recommendation.

PLAN DESCRIPTION

The selected plan of improvement consists of about 5 miles of earth levee and 600 feet of floodwall along Jordan Creek, the Raccoon River, and Walnut Creek. About 4.3 miles will be new levee construction and 0.4 miles will involve improving the existing Walnut Creek levees. Levees have been used in the design wherever possible and floodwalls incorporated into the plan were where land restrictions or existing land use prohibit construction of levees.

A place of business and seven homes will need to be relocated. Several gated closure structures will be required at points where roads and railroad tracks cross the line of protection. Four road ramps are also included in the plan. A portion of floodwall will extend along existing parking lots near Grand Avenue.

Recreation features of the proposed flood protection plan include a bicycle trail and a fisherman's access point in Des Moines and a city park and bicycle trail in West Des Moines. The bicycle trail proposed for Des Moines will expand their existing trail system and serve as a vital link in the community's regional trail network. The new paved trail will begin with a ramp at 63rd Street near the proposed boat launching area and, in general, will continue northerly along the top of the levee, extending into West Des Moines. Access points to other city-proposed trails are included in the plan. The fisherman's access point planned as a recreational feature of the selected plan will include a boat ramp, parking lot, and fishing area adjacent to the Raccoon River east of 63rd Street. At West Des Moines, planned recreational facilities include a city park and a bicycle trail. The low-density open space park would be developed in conjunction with the levee and ponding area. It will include an access road, parking lot, outdoor furniture, and access to the gravel pits for fishermen. The bike trail in West Des Moines would be a continuation of the trail through Des Moines and would follow the levee to Hoak Drive where a ramp would lead down from the levee.

PLAN ACCOMPLISHMENTS

Basically, this plan accomplishes the initial goal of the study--to provide a technically practical, economically feasible, and socially acceptable solution to the flood problem of West Des Moines-Des Moines. The plan protects the area from the Standard Project Flood. The plan also provides a portion of the recreation needs of the area. Minimal adverse or social impacts are involved. The plan provides beneficial effects to the region by creating opportunities ities for increased use and development of the flood plain land resource and preservation of historic and archaeological resources.

Residual needs, such as wise future use of the flood plain, flood damage reduction measures for areas excluded from protection and realization of the recreational potential still exist in the area.

The information generated by this study and report will be helpful to local interests in addressing these needs and in establishing flood plain regulations.

EVALUATED ACCOMPLISHMENTS

This plan provides flood protection for Des Moines and West Des Moines. It also provides for recreational development and includes considerations for the preservation of historic and archaeological resources.

PLAN EFFECTS

Both indirect and direct and adverse and beneficial effects will result from the selected plan.

ENVIRONMENTAL EFFECTS

Except for the 44 acres required for borrow areas, the project will not significantly affect the environment. Geology and soils will remain relatively the same. The physical contour of the flood plain will change only slightly as the levee provides a contrasts from the relatively flat level flood plain that exists now. No changes in climate are anticipated. Some changes in the biological elements are expected. About 22 acres of existing vegetation will be destroyed by construction. Most of this damage will occur along the Walnut Creek. The proposed ponding areas have very limited value botanically or as wildlife habitat and only insignificant changes are expected to occur. The 44 acres being taken for borrow are presently being used for agriculture. These areas will be seeded when the project is completed. Some siltation and turbidity caused by erosion from construction activities is likely to occur along Walnut Creek, however, this is expected to be localized and short-term and should not make a significant impact on the aquatic resources. The contractor will be required to comply with Federal, State, and local regulations concerning air and noise pollution during construction. Since most of the property bordering the levee is either commercial, industrial, railroad, or street right-of-way, the streams are not readily accessible to the public. Virtually no residences exist in the area with a view of the river, and as a result, no river view will be interrupted. The ponding areas will change the relatively bare ground into open water and temporarily prohibit their use for outdoor sports and other recreational activities. Seeding the levee will provide erosion control and improve the aesthetics of the levee. The levee will also provide expanded recreational development opportunities. With the assurance of flood protection, increased urbanization and development of the flood plain can also be expected which should increase the regional economy.

OTHER EFFECTS

The plans affects on other factors such as the social well-being and the regional development of the area are also considered.

Transportation and public facilities should not be significantly affected, except for possible interruption during construction. After completion of the project, access and services should be uninterrupted and maintenance costs should be reduced since flooding and the resulting cleanup will be virtually eliminated. This should help improve both the local and regional economy.

Economy of the area should be improved by the plan. Tangible benefits of this project consist of protection against flood damage to industrial, commercial, residential, agricultural, and public property. Intangible benefits include increased safety, welfare, social stability, and economic stability to the residents and employees of the area. The project should result in development and growth continuing at least at its present rate. If no project were implemented growth in the flood plain area would be restricted by the requirements of the Flood Disaster Protection Act of 1973.

Recreation opportunities such as hiking, bicycling, nature study, bird watching, and picnicking would result from the project. The plan will accommodate recreational needs. The bicycle trail will expand the existing regional trail network and offer scenic views of Walnut Creek, Raccoon River, and the surrounding lowland forests.

Historical and archaeological sites are not found in the immediate project area. Based on the preliminary survey made for this study, there are no historical or archaeological sites located directly within the project area. Coordination will be maintained with the

State Historic Preservation Office if any sites are discovered during construction.

DESIGN

The levees were designed to provide protection from the Standard Project Flood. Three feet of freeboard will be provided along most of the line of protection. Four feet of freeboard will be provided in the remaining areas. The levees will be constructed of semicompacted clay with a crown width of 10 feet. Levee slopes will be seeded. About 4.3 miles of the levee will be new embankment and the remaining 0.4 mile will be improved. Average height will be about 14 feet.

A small amount of the clay borrow will be obtained from two ponding areas. The rest will be taken from a 44-acre borrow area located within the West Des Moines city limits about 2.5 miles west of the project area.

Two types of floodwalls are planned--precast concrete floodwall which will be used from the point where the alignment crosses First Street and an I-type concrete floodwall which will be used between the upstream end of the precast wall and Grand Avenue. Another section of I-wall is planned along the west side of First Street upstream of Grand Avenue to preserve parking spaces and vehicle access to commercial establishments.

Eight closure structures for roads and railroads are included in the plan design. The plan also includes raising parts of four streets. Automatic flood warning systems will be installed for Walnut Creek and Jordan Creek as a part of the plan to allow time for city officials to erect the closure structures.

Interior drainage studies were made to determine any pumping needs. The area was divided into 7 sections and existing drainage facilities were evaluated. Average annual damages that would be prevented by these three pump plants were estimated and compared against costs, to determine benefit-to-cost ratios for various pump plant sizes. Three permanent pump plants were recommended.

Recreation will include a bicycle trail with an 8-foot wide asphalt surface and a gravel-surfaced parking lot which will serve a 12-foot wide concrete boat launching ramp. The park would include wood tables and benches, a gravel road, and parking lot. Concrete steps will cross the levee to provide access to a fishermen's pier at the shore of the gravel pit.

CONSTRUCTION

Assuming authorization and availability of funds, it is estimated that 2 years will be required following engineering and design analysis.

OPERATIONS AND MAINTENANCE

After completion of the project, operation and maintenance would become a responsibility of local interests. Each city will be responsible for those features located within their boundaries.

ECONOMICS OF THE SELECTED PLAN

Economic data are developed to determine the benefit-to-cost ratio of each alternative and detailed data are developed on the selected plan.

METHODOLOGY

Tangible economic justification of the selected plan can be found by comparing equivalent average annual costs (including interest, amortization, operation and maintenance, and major replacements) with an estimate of the equivalent average annual benefits that would be realized over the project economic life. Values of costs and benefits that would accrue to the plan at different times were made comparable by conversion to an equivalent time basis using the current Federal interest rate of 6-1/8 percent.

COSTS

The estimated first cost for the project is $7,149,000. The Federal portion is $5,643,000 and the non-Federal share is $1,506,000. Estimated annual costs are based on a 100-year period of analysis and include interest and amortization charges. The annual costs are estimated to be $495,467; $367,762 Federal and $127,705 non-Federal.

DAMAGES

Damages in the flood plain were designated by classes and types and included damage caused by innundation, flood emergency losses, business or other financial losses, loss of profit and wages, and increased cost of normal operations and living. Field surveys were made and previous data compiled to determine damage curves and to develop depth-damage relationships. Average annual damage figures were developed by combining flow-frequency curves with the depth-damage curves and computing the damage that would occur at various levels of flooding on each stream. Under existing conditions, average annual damages are estimated to be $803,300. Considering anticipated future development, average annual damage is expected to be $1,151,800.

BENEFITS

The existing benefits which accrue to the project are based on March 1975 prices and conditions of development. Benefits in the future occur from the future growth in the flood plain occurring over the project life. The year 1982 is used as the base year for the study since it is the most probable year the project will be completed. Primary tangible flood damage reduction benefits for the plan equal the difference between flood damages with and without the selected plan. Under existing development conditions, average annual benefits would total $815,700. Under future conditions, average annual benefits would total $1,168,900. Analyzed against an average annual cost of $495,467 the benefit-to-cost ratio under the two conditions are 1.65 and 2.36, respectively. Table 4 summarizes the benefit analysis.

Table 4

SUMMARY OF ESTIMATED ANNUAL BENEFITS
ESTIMATED ANNUAL COSTS, AND B/C RATIO

TYPE	Walnut Creek	Raccoon River	Total
Flood Damage Reduction (Existing Conditions)	$ 266,100	$513,500	$779,600
Recreation			86,100
Annual Costs			495,467
B/C Ratio			1.65
Increase to Base Year			86,300
Future Growth Increase			254,400
Land Enhancement			12,500
			$1,168,900
B/C Ratio			2.36

OPTIMIZATION

Optimization is a mathematical process which scales a project to the point where the greatest excess of benefits over costs occur. The optimal economic return occurs at the 200-year level of protection in the project area.

JUSTIFICATION

A level of flood protection equal to the Standard Project Flood is recommended for the project area. The recommended level is economically justified. Although the optimal return occurs at the 200-year level of protection, the higher level of protection is recommended to reduce the risk of levee overtopping with potential catastrophic results in the intensely developed urban area.

DIVISION OF PLAN RESPONSIBILITIES

Legislative and administrative policies have established the basis for Federal and non-Federal responsibilities and cost apportionment in the construction and operation and maintenance of Federal water projects.

This portion of the report summarizes the responsibilities for the selected plan and provides information on cost apportionment.

COST APPORTIONMENT

Cost sharing between Federal and non-Federal interests for the selected plan is established by Federal policy.

Federal costs are estimated at $5,643,000 and would include the cost of design and construction. Total non-Federal costs are estimated at $1,506,000 and would include land acquisition costs and relocation or alteration expenses. Table 4 shows the apportionment of the $7,149,000 total first costs and $495,467 average annual costs between the Federal and non-Federal interests.

Table 5

COST APPORTIONMENT

	Estimated First Cost	Average Annual Cost
Federal	$5,643,000	$367,762
Non-Federal	1,506,000	127,705
Total	$7,149,000	$495,467

Of the non-Federal expenses, West Des Moines' share would involve $1,044,000 of the estimated first costs and $23,155 of the annual cost for operation, maintenance, and replacement. Des Moines would be required to pay $462,000 of the estimated first cost of the project and $900 of the annual costs for operation, maintenance, and replacement.

FEDERAL RESPONSIBILITIES

In general, the Federal responsibilities include design and construction of the various features of the protective works.

NON-FEDERAL RESPONSIBILITIES

Non-Federal interests must meet all components of the local cooperation agreement. In general, basic non-Federal responsibilities include providing lands and rights-of-way, payment for relocations and alterations, hold and save the United States free from damages, and maintain and operate the completed project.

PLAN IMPLEMENTATION

Steps necessary to follow in realizing the construction of the proposed plan of improvement are summarized below:

* After review by the Chief of Engineers, Office of Management and Budget, and the Secretary of the Army; the report is forwarded to Congress for authorization and subsequent project funding.

* After funding is initiated, two design memorandums, plans, specifications, and an engineering estimate are prepared by the District Engineer, bids are solicited and a contract awarded. Local action is implemented during this same time.

* Following construction of the project, local interests assume responsibility for the operation and maintenance.

VIEW OF NON-FEDERAL INTERESTS

The plans of improvement were coordinated and discussed with residents of the basin, city officials, county officials, and a variety of State and local agencies. Public meetings were held to obtain views and comments from the local interests. Appendix 2 contains Pertinent Correspondence relating to this project from some of the non-Federal interests involved in this coordination effort.

REVIEW BY OTHER FEDERAL AGENCIES

The report and environmental impact statement will be furnished to pertinent Federal agencies.

SUMMARY

Flooding and related water resources problems of the Des Moines River Basin prompted local interests to request Congressional authorization of a study of those problems.

Several authorizing resolutions, subsequent interim studies and reports, flood control improvements, and flood plain studies have followed the initial request. The original resolution concerned study for the entire Des Moines River Basin, however, since that time significant changes occurred which altered the basin's flood problems. Construction of both the Red Rock and Saylorville projects and other local protection projects in the basin have greatly reduced flooding. In addition, many survey reports, small flood control project reports, or flood plain information reports have been developed and several have resulted in projects which are now under or nearing construction. This report summarizes previous studies and resulting projects. It discusses the investigations made and the alternatives considered and culminates the studies and investigations through the recommendation of a plan for improvement.

The Des Moines River flows southeasterly for about 535 miles, originating in southwestern Minnesota and extending to just south of Keokuk, Iowa. Major tributaries of the basin are the East Fork and the West Fork of the Des Moines River, Boone River, Raccoon River, Middle River, and South River.

The most important resource of the basin is its rich farmland, but industrialization in the major population centers is rapidly increasing. Population in the basin has been increasing since before 1930, but there is a growing trend for migration from agricultural areas to the urban areas.

Since periodic flooding has caused varying degrees of urban and crop damages within the basin, flooding was addressed as the major problem in this report. Other needs such as navigation, recreation, water supply, water quality, irrigation, recreational development, and erosion and sediment problems were also investigated.

At the many public meetings held, local interests indicated flooding to be of major concern. Residents requested studies of various flood control or detention reservoirs and several local protection projects.

Plan formulation evolved around a variety of criteria, standards, and principles all designed to allow an expedient and yet efficient selection of alternative solutions that would solve the basin's problems and needs.

Initial solutions investigated included both structural and nonstructural alternatives. Reservoir projects and local flood projects were considered for the flood prone communities. Nonstructural measures such as flood proofing, flood forecasting and warning systems, and flood plain management were investigated as were environmental corridors.

Of the possible solutions for basin flooding, six were determined feasible enough to warrant additional consideration--a reservoir on the Raccoon River near Jefferson, Iowa; a reservoir on Walnut Creek about 0.1 mile upstream from the Polk-Dallas County line; a local protection project for West Des Moines and a small portion of Des Moines, Iowa, on Walnut Creek; Des Moines, Iowa, on Fourmile Creek; an environmental corridor on the Des Moines River which would provide additional flexibility to Saylorville Lake; and a Walnut Creek Environmental Corridor which would mitigate the loss of wildlife resulting from the Walnut Creek Reservoir.

All but the local protection project for West Des Moines and Des Moines on Walnut Creek were eliminated from further consideration either by completion of separate studies and implementation of projects as a result of those studies, or by occurrence of events which made proposed measures infeasible.

The remaining plan of improvement for West Des Moines was selected and is recommended for implementation by the District Engineer. It involves about 5 miles of new and improved earth levees and several sections of floodwalls which will protect the area against the Standard Project Flood. Environmental effects of the selected plan would be minimal. About 44 acres will be required for borrow that is now in agricultural production. And about 22 acres of land surrounding a wooded area will be disrupted by the levee. Seeding and landscaping the levees and borrow area should help to mitigate these adverse environmental effects.

Costs of the project are estimated to be $7,149,000. Under existing conditions, benefits are estimated to be $815,700. Under future conditions, benefits of $1,168,900 are expected. The benefit-to-cost ratios are 1.65 and 2.36, respectively.

STATEMENT OF FINDINGS

INTRODUCTION

I have reviewed and evaluated, in light of the overall public interest, the documents concerning the proposed local flood protection project and the various alternatives studied for the Des Moines River Basin. I have also evaluated the views of interested agencies and the concerned public in selecting the recommended plan of improvement.

BACKGROUND

The proposed project resulted from a study authorized by resolutions adopted on 10 July 1945 by the Committee on Commerce of the United States Senate and on 1 July 1958 by the Committee on Public Works of the House of Representatives, United States. Residents of the Des Moines River Basin requested a study to investigate flood damage reduction measures primarily in the upper basin to supplement the now completed Red Rock Dam and Lake Red Rock project on the Des Moines River and the completed local protection project at Des Moines, Iowa. An Interim Report prepared under authority of the 10 July 1945 resolution resulted in construction of the nearly completed Saylorville Lake and Saylorville Dam project on the Des Moines River. Several other studies and reports have been completed for the basin under other authorities.

Several public meetings have been held during the study period. In 1970 a series of public meetings was held to discuss six proposed projects:

* Multipurpose Reservoir on the Raccoon River near Jefferson, Iowa

* Multipurpose Reservoir on Walnut Creek near Des Moines, Iowa

* Local Flood Protection Project at West Des Moines and Des Moines, Iowa

* Local Flood Protection Project along Fourmile Creek at Des Moines, Iowa

* Environmental Corridor on Des Moines River Downstream from Saylorville Dam

* Environmental Corridor on Walnut Creek Downstream from Proposed Walnut Creek Dam and Reservoir

Following the 1970 public meetings, five of the six proposed water resource projects were eliminated from further consideration by completion of separate studies and projects implemented as a result of them. Viable alternatives were reduced to only the West Des Moines and Des Moines Local Protection Project. The remaining plans were eliminated for the reasons summarized below.

* DES MOINES, IOWA, FOURMILE CREEK--The city of Des Moines requested a separate study be made of this flood problem under a special small project authority available to the Corps of Engineers. A Detailed Project Report was prepared on this study. And, as a result, Fourmile Creek was no longer considered in the scope of this study.

* DES MOINES RIVER ENVIRONMENTAL CORRIDOR--This is currently being considered as a modification to the Saylorville Lake Project and is being coordinated with the State of Iowa, Polk County, and the city of Des Moines.

* WALNUT CREEK AND JEFFERSON RESERVOIRS--Local cooperating sponsors for both of these have indicated a lack of financial capability and/or interest in the recreation cost-sharing involved in the plans. The United States Environmental Protection Agency has indicated that allocation of storage for water quality in Jefferson Reservoir is unnecessary. As a result, further consideration has been discontinued.

* WALNUT CREEK ENVIRONMENTAL CORRIDOR--The lack of interest in the reservoir also resulted in a lack of a local sponsor for the environmental corridor plan.

A late stage public meeting was held in May 1975 at West Des Moines to discuss the draft basin report which had been distributed throughout the area prior to the meeting. The selected plan received strong support from local officials and residents and State and other Federal agencies. Statements, correspondence, and responses are included in the final report and EIS. The most significant opposition to the proposed plan centered on the proposed protection alignment along Walnut Creek near the upstream tie-off. The proposed alignment would exclude several properties from the protected area. Following a meeting with the property owners the District agreed to review the proposed alignment during post-authorization studies.

THE SELECTED PLAN

The selected plan consists of about five miles of new and improved earth levees, including 600 feet of floodwall along Jordan Creek, Raccoon River, and Walnut Creek in the communities of West Des Moines and Des Moines, Iowa. The proposed project would protect about 927 acres including 922 homes, 143 businesses, and 22 industries from the Standard Project Flood. The selected plan includes four street raises, eight gate closure structures, four storm water ponding areas, three storm water pumping stations, and several gravity outlet structures. The plan includes recreational facilities to be cost shared by the US Government and the local communities. Facilities include bicycle paths, fishing piers, a boat ramp, and a small park. The plan also includes installation of flood warning systems on Jordan Creek and Walnut Creek. A 44-acre borrow site located 2.5 miles west of the project area was selected by local officials. Proposed beautification features include seeding and landscaping of the levees and ponding areas.

ALTERNATIVES

NO ADDITIONAL ACTION

This alternative plan for flood damage reduction would consist of existing and proposed flood plain regulations, flood insurance, flood forecasting and a warning system of National Weather Service, and emergency flood fighting and evacuation measures.

Flood plain regulations would prevent future flood damages by prohibiting construction of flood vulnerable structures. Existing structures in floodways could be evacuated over the long-term. However, an estimated $803,000 in average annual flood damages would continue for existing development in the flood fringe areas. Flood insurance would provide reimbursement to inhabitants of the flood plain but the cost of flood damages to the Nation would increase because of the administration costs of the program. Flood warning and forecasting may prevent loss of life during flood periods; but the economic, health, and associated costs of flooding will remain. The "no additional action" plan would not effectively reduce flood damages or hazards to public health and safety.

NONSTRUCTURAL

Total permanent evacuation of the flood plain and partial evacuation combined with flood proofing of selected structures were evaluated and found to be economically, socially, and environmentally infeasible as a solution for flood damage in the study area. The adverse impacts of evacuating or flood proofing over 1,100 homes and businesses would make such a plan infeasible.

STRUCTURAL

Levee and Floodwall. In addition to the selected plan, levee alignment modifications were considered along the right bank of Walnut Creek upstream of Grand Avenue. Structural protection was also considered for urban developments along the left bank of Walnut Creek at Grand Avenue and along the right bank of Jordan Creek downstream of Fuller Road.

- Alignment 1-B would have placed the line of protection on the east side of 63rd Street. No additional development would be protected and the proximity to Walnut Creek would cause rises in the 100-year flood exceeding one foot. In addition, the cost of one additional closure structure and channel modifications necessary to accommodate a reach of floodwall makes this alignment significantly more costly than the alignment on the west side of 63rd Street which is in the selected plan.

- Alignment 1-C considered raising a portion of Hoak Drive 9-10 feet and including it as part of the line of protection which would be extended to the I-235 embankment. Two additional developments along Center Street would be protected. The additional cost of this alignment is greater than the flood damage reduction benefits received and access to three businesses would be seriously impeded.

- Alignment 1-D examined the feasibility of providing protection to a cement plant south of Center Street. The close proximity of the plant to Hoak Drive and Center Street and the access requirements of truck traffic make the cost of floodwalls and several closure structures greater than the benefits received.

- Alignment 1-E would extend protection to three businesses on the east side of Hoak Drive and to a house and business along Center Street. Encroachment into the floodway by this alignment would increase 100-year flood heights in a residential area on the opposite bank by more than two feet making mitigative measures necessary for that area. Protection of the residential area could be accomplished by construction of a levee there or by channelization of a short reach of Walnut Creek to increase capacity and velocity. Neither mitigative levee construction nor channelization required to accompany this alternative would be economically feasible. The benefit-to-cost ratio of alignment 1-E and levee construction on the opposite bank is 0.8:1. The benefit-to-cost ratio of 1-E and channelization is 0.4:1. In addition, both mitigative measures would destroy lowland woods and disrupt aesthetics of the stream.

* Alignment 2 would increase the protected area to include seven additional businesses and four residences by construction of levees along the left bank of Walnut Creek in the vicinity of Grand Avenue. Cost of this plan is $910,000 excluding rights-of-way. Annual damage reduction benefits are $26,400 resulting in an unacceptable benefit-to-cost ratio of 0.5:1.

* Alignment 3 would expand the protected area by construction of levees along the right bank of Jordan Creek and the left bank of the Raccoon River. Several industries located in an industrial park would receive flood protection. Cost of this alignment is $500,000 excluding rights-of-way and drainage facilities. Annual benefits are $500 and the resulting benefit-to-cost ratio is only 0.02:1. Environmental effects of this alignment would be loss of lowland woods and agricultural land.

Several comments were received during the late stage of the study by property owners along Hoak Drive who would be excluded from the selected plan. The proposed plan along Walnut Creek upstream of Grand Avenue would be reviewed during post-authorization studies to consider the concerns expressed by these property owners.

Reservoirs. Upstream multipurpose reservoirs were considered on the Raccoon River and Walnut Creek. Reservoirs were found to be infeasible on the basis of flood damage reduction benefits alone. Local interests were either financially unable or did not wish to participate in a cost-sharing recreation plan for reservoirs on either stream. The United States Environmental Protection Agency (EPA) has determined that allocation of reservoir storage at Raccoon River sites is unnecessary for water quality control. The reservoir studies also revealed that because of the large uncontrolled drainage area between the reservoir sites and the West Des Moines area that other flood damage reduction measures would be required in conjunction with upstream reservoirs. Flood stages could not be reduced sufficiently to eliminate flood damages with reservoirs only.

Channel and Bridge Modifications to reduce flood damages in the study area were found to be economically and environmentally infeasible. The higher financial cost, the adverse effects on the natural resources for wildlife habitat and recreation, and the possible adverse impacts on the infiltration gallery water supply system for the city of Des Moines located along the Raccoon River would preclude widening and straightening channels to reduce levee or floodwall heights.

EVALUATION

The following considerations were pertinent in evaluating the selected plan.

ENVIRONMENTAL CONSIDERATIONS

Environmental considerations included avoiding adverse impacts wherever possible and providing mitigation for adverse impacts which could not be avoided. Approximately 22 acres of flood plain vegetation of value as wildlife habitat will be destroyed. After construction, landscaping and reestablishment of vegetation would help mitigate the impact on wildlife. The major borrow site will disturb 44 acres presently in agriculture. This land will be returned to a condition suitable for agriculture or other use as determined locally. The project is planned to be compatible with existing recreation uses and coordination is continuing with local interests to develop a plan to enhance recreation opportunities in conjunction with the project. No archaeological or historical resources of the area would be adversely affected by the project. A secondary effect of providing increased flood protection could be acceleration of development with resulting changes in land use and loss of existing vegetation. Local governments presently have the necessary legal means to insure that natural areas are protected while allowing for appropriate growth.

SOCIAL WELL-BEING CONSIDERATIONS

The proposed plan would protect some 927 acres of flood fringe area including 922 homes, 143 businesses, and 22 industries. The health, safety, and well-being of the residents of the protected area would be improved over existing conditions during periods of flooding. Anxieties associated with potential flooding and emotional stress induced by flooding would be eliminated within the protected area. The relocation of one business and seven homes would be required by the proposed plan. Transportation services and facilities would no longer be interrupted by flooding. The recreational opportunities which will result from the plan will also benefit the residents of the area. Floods flows greater than the design flood flow for each stream could potentially overtop the proposed line of protection. Such a flood event would be extremely rare, however. Unprotected areas will continue to suffer flood damages. Residents of these areas may feel alienated by the proposed action.

ENGINEERING CONSIDERATIONS

Earthen levees are proposed, where land is available, to avoid the high cost of floodwall construction. Floodwalls will be either poured concrete I-wall or precast concrete. Freeboard of at least three feet will be provided to prevent overtopping by wave wash and to provide allowance for other hydraulic uncertainties with respect to large floods.

Levee alignments are compatible with preliminary encroachment limits along streams. Future planning of the project will take into account the floodway limits that will be established by the local communities. The specific project effects on flood stages have been reviewed and approved by the Iowa Natural Resources Council.

ECONOMIC CONSIDERATIONS

Economic optimization of the selected plan was calculated considering the level of flood protection which provides the greatest flood reduction benefits compared to the cost of construction, operation, and maintenance of the project. The studies indicated that flood protection to a level of the 200-year-frequency flood would provide the maximum net benefits. The Standard Project Flood level of protection is recommended, however, to increase the safety and well-being of the residents of the protected flood plain.

The estimated Federal first cost of construction is $5,643,000 and the estimated non-Federal first cost is $1,506,000; these total $7,149,000. The Federal average annual cost calculated at 6-1/8 percent interest is $367,800, and the non-Federal average annual cost is $127,700; these total $495,467. The estimated average annual benefits corresponding to the design level of protection are $815,700, for existing conditions; and $1,168,900 for conditions including an increase to the base year, future growth, and land enhancement. The benefit-to-cost ratio for existing conditions is 1.65, and the benefit-to-cost ratio including future growth and land enhancement is 2.36.

CONCLUSIONS

I find that the selected plan is based on a thorough analysis and evaluation of alternatives. Adverse effects are avoided where possible, and where not possible are mitigated by contrasting beneficial effects. The plan satisfies the goal of finding a socially acceptable and economically and environmentally justified project to solve the flood problems in the Des Moines River Basin.

It is my decision to recommend implementation of the project for West Des Moines and Des Moines, Iowa, along the Raccoon River, Walnut Creek, and Jordan Creek.

RECOMMENDATIONS

It is my recommendation that the selected plan which would provide protection for the city of West Des Moines and a small part of Des Moines, Iowa, be implemented, with such modification as, in the discretion of the Chief of Engineers, may be advisable.

The plan involves about 5 miles of earth levees and 600 feet of concrete floodwalls. Total first cost to the Federal Government is estimated to be $5,643,000.

This recommendation is made, provided that the officials of West Des Moines and Des Moines, Iowa, prior to the commencement of construction, enter into a local cooperation agreement satisfactory to the Secretary of the Army in which they:

a. Provide without cost to the United States all lands, easements, and rights-of-way, including ponding areas and suitable areas for borrow and disposal of excavated material, as determined to be necessary by the Chief of Engineers for construction of the project;

b. Hold and save the United States free from damages due to the construction works, not including damages due to the fault or negligence of the United States or its contractors;

c. Operate and maintain all the works after completion of the project in accordance with regulations prescribed by the Secretary of the Army;

d. Accomplish without cost to the United States alterations and relocations of buildings, transportation facilities, storm and sanitary sewer systems, public and private utilities, local betterments, drainage facilities, and other structures and improvements made necessary by construction of the recommended plan, as determined by the Chief of Chief of Engineers, excluding facilities necessary for the normal interception and disposal of local interior drainage at the line of protection;

e. Prescribe and enforce regulations to prevent obstruction or encroachment on channels and ponding areas which would reduce their flood-carrying capacity or hinder maintenance and operation;

f. Provide a cash contribution for recreation equal to 50 percent of the final separable cost allocated to this function less a credit for the value of lands, easements, rights-of-way, alterations, and relocations allocated therefor; and

g. Publicize flood plain information in the areas concerned and provide this information to zoning and other regulatory agencies for their guidance and leadership in preventing unwise future development in the flood plain and in adopting such regulations as may be necessary to insure compatibility between future development and protection levels provided by the project.

It is further recommended that, unless otherwise stated herein, the exact amount of non-Federal contributions shall be determined by the Chief of Engineers prior to construction of the project.

DANIEL L. LYCAN
Colonel, Corps of Engineers
District Engineer

[First endorsement]

NCDPD-PF (June 75)
SUBJECT: Feasibility Study for Des Moines River Basin, Ia. and Minn.

DA, North Central Div., CE, Chicago, Ill. 26 June 1975

TO: HQDA (DAEN-CWP-C) WASH DC 20314

I concur in the recommendations of the District Engineer.

W. O. BACHUS
Brigadier General, USA
Division Engineer

TECHNICAL REPORT

Section A - THE STUDY AND THE REPORT

Section B - RESOURCES AND ECONOMY OF THE STUDY AREA

Section C - PROBLEMS AND NEEDS

Section D - FORMULATING A PLAN

Section E - THE SELECTED PLAN

Section F - ECONOMICS OF THE SELECTED PLAN

Section G - DIVISION OF PLAN RESPONSIBILITIES

APPENDIX 1

SECTION A

THE STUDY AND THE REPORT

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SECTION A

THE STUDY AND THE REPORT

1. The authority, purpose, and scope of this study are presented in this section of the report. This background information is provided as a helpful introduction to the report's organization and content.

PURPOSE AND AUTHORITY

2. This study was made to investigate the water resource problems and needs in the Des Moines River Basin and to seek solutions that satisfy the needs and alleviate the problems.

3. The study and consequent report are in response to the following Congressional resolutions which authorized the study.

> Resolved by the Committee on Commerce of the United States Senate, that the Board of Engineers for Rivers and Harbors, created under Section 3 of the River and Harbor Act approved June 13, 1902, be,

> and is hereby, requested to review the report on the Des Moines River, Iowa, printed in House Document Numbered 651, Seventy-eighth Congress, Second Session, with a view to determining whether any modification therein should be made at this time with respect to flood control and related purposes on the Des Moines River as a part of the comprehensive system of reservoirs for the Upper Mississippi River Basin, particularly with reference to the advisability of providing additional flood protection for the city of Des Moines, Iowa, by the construction of additional reservoirs on the Raccoon and Des Moines Rivers. (Adopted 10 July 1945.)

4. The second resolution reads:

> Resolved by the Committee on Public Works of the House of Representives, United States, that the Board of Engineers for Rivers and Harbors be, and is hereby, requested to review the reports on the Des Moines River, contained in House Document 651, 78th Congress, with particular reference to the Upper Des Moines River and the tributaries thereof, to determine the feasibility and justification of improvements for flood control and related purposes. (Adopted 1 July 1958.)

SCOPE OF THE STUDY

5. The original authorizing resolutions directed a review of the flood and related water resource problems of the entire Des Moines River Basin. One interim report has been submitted under this authorizing resolution. Saylorville Dam and Lake project, which is nearing completion on the Des Moines River upstream of the city of Des Moines, was authorized in 1958 based on an interim report submitted under the authority of the 10 July 1945 resolution.

6. The Red Rock Dam and Lake Red Rock project located on the Des Moines River downstream from the city of Des Moines and the Des Moines Local Protection Project were authorized in 1938 and are now constructed and in operation. Completion of Red Rock Dam and Lake Red Rock and near completion of the Saylorville flood control project have greatly reduced the flood problems on the Des Moines River downstream from Red Rock. A local protection project completed for the city of Des Moines also helped to reduce the flood threat.

7. As a result, the scope of the original study has been narrowed and this report is primarily concerned with the basin upstream from the city of Des Moines. It also includes, however, such tributary streams as Whitebreast Creek and North, Middle and South River which empty into the Des Moines River downstream from Des Moines and into Lake Red Rock.

8. The study considered a variety of improvements such as reservoirs, channel improvements, and levees and floodwalls to protect urban areas.

STUDY PARTICIPANTS AND COORDINATION

9. Coordination has been maintained throughout this study with both the affected and the general concerned public and with the local, State, and Federal agencies. The public involvement program has been a continuous effort since the study began. From 1959 to 1971, the program was very active. Recently, it has diminished to close coordination with the representatives of local entities involved.

PUBLIC HEARINGS

10. In 1959, five public hearings were held in the basin to ascertain from local people their feelings on the nature and extent of flood damages and the frequency of flood occurrences. Suggestions for flood control measures were also requested.

11. In 1970, three public hearings were held to describe six proposed improvements to the general public and to obtain views regarding each proposal. Five of the six proposals were eliminated from this report by separate interim reports which determined infeasibility of some of the projects, recommeneded authorization for others, or which recommended further study. In 1975 a public hearing was held to describe the remaining proposed improvement at West Des Moines and Des Moines.

AGENCY COORDINATION

12. Several meetings were held in 1970 at selected locations and in 1975 at West Des Moines to inform local officials of preliminary plans and proposals. Area residents also attended these meetings.

13. Much of the coordination with interested Federal and State agencies consisted basically of written correspondence between the Corps of Engineers and those agencies. A particularly thorough coordination effort was conducted to determine hydrologic design criteria for Walnut Creek in connection with the West Des Moines--Des Moines Local Flood Protection Project. This effort involved

the US Geological Survey, the Iowa Natural Resources Council (INRC), affected cities, and the Corps of Engineers.

14. In the late stages of the study, a recently formed regional planning agency was invited to participate. This agency, Central Iowa Regional Association of Local Government (CIRALG) serves as the local coordinating group for such studies.

15. Some of the other State and Federal agencies involved in the coordination effort include:

* Public Health Service, US Department of Health, Education and Welfare.

* United States Environmental Protection Agency

* Mississippi River Basin Commission

* Federal Power Commission

* National Park Service

* Bureau of Outdoor Recreation

* Fish and Wildlife Service

* Soil Conservation Service, US Department of Agriculture

* Bureau of Mines

* Department of Transportation

- State Historical Department of Iowa

- Iowa State Conservation Commission

16. Local government agencies involved in the coordination included:

- Des Moines, Iowa.

- West Des Moines, Iowa.

- Dallas County Conservation Board.

- Polk County Conservation Board.

THE REPORT

17. This report has been organized into three parts--a main report and two appendices. The main report is a nontechnical presentation of the study and its results and is basically intended for the general public. Appendix 1 is a technical report written for the technical reviewer. It is organized under the same basic topics as the main report, but the corresponding discussions in the technical appendix are an elaboration of the discussions in the main report. Appendix 2 involves pertinent correspondence. It includes a summary of correspondence concerning the early coordination efforts of the study. More current correspondence from 1970 to date is included as written.

PRIOR STUDIES AND REPORTS

18. Many studies and subsequent reports have been made on the Des Moines River Basin in general and on specific localities within the basin.

* A report, "Des Moines River, Iowa," submitted by the Chief of Engineers on 15 December 1930, was published as House Document No. 682, Seventy-first Congress, Third Session. The report was made under the provisions of House Document No. 308, Sixty-ninth Congress, First Session, which was enacted into law with modifications in Section 1 of the River and Harbor Act of 21 January 1927 and under the provisions of Section 10 of the Flood Control Act of 15 May 1928. The report concluded that improvement of the Des Moines River for navigation, irrigation, water power, and flood control or any combination thereof, should not be undertaken by the Federal Government at that time.

* A comprehensive report on reservoirs in the Mississippi River Basin, submitted 26 July 1935 under Section 10 of the Flood Control Act approved 15 May 1928, is published as House Document No. 259, Seventy-fourth Congress, First Session. This report contains data on two possible flood control reservoirs on the Des Moines River, one near Howell, Iowa, and one near Belfast, Iowa.

* A review report dealing with the advisability of improving the Des Moines River for navigation was made under resolutions adopted by the Committee on Rivers and Harbors of the House of Representatives on 31 July 1935 and by the Committee on Commerce

of the United States Senate on 21 August 1935. The report concluded that potential tonnage for waterborne transportation on the Des Moines River would not warrant the cost of improvement, and no project was recommended at that time.

* House Committee Report No. 2353, Seventy-fifth Congress, Third Session, dated 13 May 1938, contains, among other items, the results of a review of previously considered comprehensive plans for flood control for the Mississippi River. A reservoir on the Des Moines River near Howell, Iowa, was included in the comprehensive plan of reservoirs for the Upper Mississippi River Basin.

* House Document No. 651, Seventy-eighth Congress, Second Session, the report being reviewed, contains a report of survey of the Des Moines River under authority of PL 685, Seventy-fifth Congress, Third Session, approved 20 June 1938. This report, dated 1941, considered all water uses. The report recommended the construction of the Red Rock project and local protection works for the city of Des Moines. Both have now been completed.

* Senate Document No. 9, Eighty-fifth Congress, First Session, contains an interim review survey report on the Des Moines River. This report, dated 31 May 1950 (revised 30 March 1953) recommended construction of the Saylorville Reservoir on the Des Moines River. This project is nearing completion.

* A report titled "Saylorville Reservoir, Water Quality Control Storage," dated 20 March 1963, was prepared pursuant to a study by the US Public Health Service, in which it was determined that the minimum flow in the Des Moines River contemplated for release from the Saylorville Reservoir should be increased. The outcome of this investigation was that Saylorville Reservoir

should be constructed as originally planned and that the additional low-flow storage should be developed at other reservoir sites.

* An unpublished report was transmitted to Congress by the Secretary of the Army on 24 March 1960 in compliance with a resolution adopted 31 July 1957, by the Public Works Committee of the House of Representatives concerning the feasibility and justification of a reservoir at Tunnel Mill site on the Boone River for flood control and related purposes. The reservoir would not have been justified economically, hence, the project was not recommended for construction. Also, an unfavorable report on local protection works at Ottumwa was forwarded to Congress by the Secretary of the Army on 21 August 1963. This report was prepared in response to a resolution of the Committee on Public Works, House of Representatives, adopted 21 April 1950.

* A review survey investigation to determine the advisability of providing additional flood protection at Ottumwa, Iowa. Between 1956 and 1964 the city of Ottumwa constructed a flood protection project entirely at city expense. A Review Survey Report for Flood Control at Ottumwa, Iowa, published in 1970 resulted in an authorized project to modify and improve a major storm interceptor sewer.

* The Upper Mississippi River Comprehensive Basin Study for development of water and land resources was completed in 1970. Its goal was to find a program to meet the present and long-term needs for flood control, navigation, water supply, water quality control, fish and wildlife enhancement, recreation, irrigation and hydroelectric power. The report discusses flood problems and possible solutions for the entire Mississippi River Basin.

* Within the Des Moines River Basin, several investigations were completed or are under way to determine the advisability of

constructing small flood control projects under provisions of Section 205 of the 1948 Flood Control Act, as amended. The projects considered are reviewed below.

A project consisting of levees, channels, and drainage structures and appurtenances on Okabena Creek at Worthington, Minnesota, was completed in 1955 at a cost of $72,432, based on a report dated 31 August 1953 and approved 1 June 1954.

A project consisting of channel enlargement and straightening, levees, and provision of drainage facilities on an unnamed creek tributary to the Raccoon River at Van Meter, Iowa, was completed in 1964 at a cost of $113,842, based on a report dated 5 April 1963 and approved 9 August 1963.

No Federal participation was recommended in a study at Guthrie Center, Iowa, on the South Raccoon River, that was submitted 20 May 1959 and concurred in on 2 June 1959.

A study at Windom, Minnesota, also resulted in no recommended Federal participation. This report was submitted on 20 August 1959 and concurred in on 11 September 1959.

A report on a study at Fort Dodge, Iowa, on the Des Moines River, was submitted 25 March 1957 and concurred in on 7 May 1957. This report recommended no Federal participation in any protective works.

Federal participation was not recommended in a report on a study at Webster City, Iowa, on the Boone River, which was submitted 18 April 1963 and concurred in 6 June 1963. The flood problems at Webster City are being restudied under the authorities of Section 205 and a report is scheduled for submission before 1 July 1975.

No Federal participation was recommended in a report on a study at Estherville, Iowa, on the West Fork Des Moines River, that was submitted 28 February 1967 and concurred in 10 March 1967.

A study for flood protection at Jackson, Minnesota, on the West Fork Des Moines River resulted in no project. This report was published in March 1971 and recommended a flood control project. However, the local fiscal requirements exceeded the capability of the city, and no action for plan implementation has occurred.

A report considering the flood problems on Fourmile Creek is also being prepared under Section 205 authority. This report is scheduled for submission by 1 July 1975.

* Flood plain information studies are also being developed for areas within the Des Moines River Basin:

The report of a flood plain information study of the Des Moines River between Saylorville Reservoir and the Center Street dam in Des Moines was completed in April 1970.

The report of a flood plain information study of the North Raccoon River at Sac City, Iowa, was completed in June 1970.

The flood problems at Windom, Minnesota, were considered in a flood plain information study completed June 1972. This report is titled the West Fork Des Moines River and Perkins Creek Flood Plain Information Study at Windom, Minnesota.

SECTION B

RESOURCES AND ECONOMY OF THE STUDY AREA

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SECTION B

RESOURCES AND ECONOMY OF THE STUDY AREA

1. The Des Moines River Basin comprises all or parts of seven counties in Minnesota, 39 counties in Iowa, and one county in Missouri. The basin is about 360 miles long and has an average width of about 40 miles. The drainage area of some 14,540 square miles covers about 23 percent of Iowa, 2 percent of Minnesota, and less than one percent of Missouri. Agriculture is the principal occupation in the basin; manufacturing and mining are the major industries. The largest city of the basin, Des Moines, had a population of 208,982 in 1960.

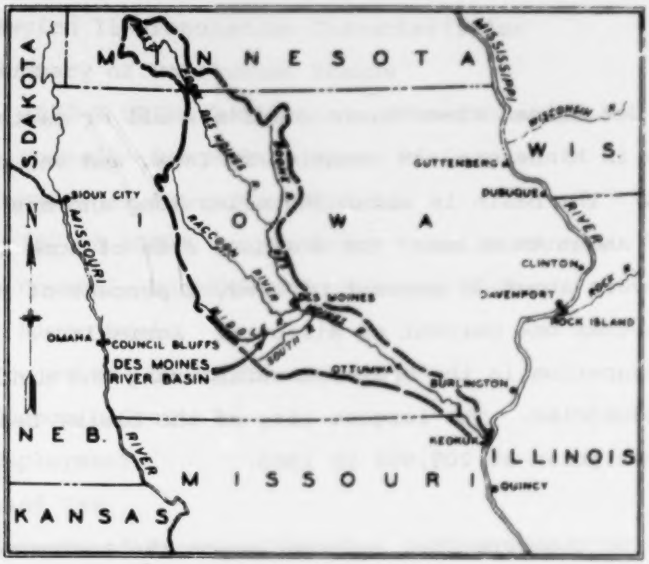
2. This section provides information on the resources and economy of the study area. It includes both an overall profile of the basin and sketches of regions within the basin.

MAJOR STREAMS OF THE BASIN

3. The Des Moines River rises in southwestern Minnesota and flows southeasterly 535 miles to its junction with the Mississippi River

at a point just downstream from Keokuk, Iowa, (Mile 361.4 above the mouth of the Ohio River).

4. The Des Moines River has numerous tributaries, many of them very short and with small drainage areas. The major tributaries are briefly described in the following listing.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IOWA
DES MOINES
BOONE R.
RACCOON RIVER
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COUNCIL BLUFFS
DES MOINES RIVER BASIN
OTTUMWA
BURLINGTON
KEOKUK
ILLINOIS
NEB.
RIVER
MISSOURI
QUINCY
KANSAS

* East Fork, Des Moines River. This tributary of the Des Moines River has its source in Martin County, Minnesota, flows southeasterly for approximately 120 miles and enters the Des Moines River approximately 14 miles upstream from Fort Dodge, Iowa. The average slope of the river is 2.6 feet per mile. It drains an area of about 1,290 square miles.

* Boone River. This stream has its source in Hancock County, Iowa, flows southwesterly and joins the Des Moines River approximately

24 miles upstream from Boone, Iowa. Its length is approximately 100 miles and it drains an area of about 900 square miles. The average slope of Boone River is 3.0 feet per mile.

* Raccoon River. This stream has its source in Buena Vista County, Iowa, flows southeasterly for approximately 210 miles and enters the Des Moines River within the city limits of Des Moines, Iowa. Its watershed area is approximately 3,640 square miles. The average slope per mile of stream is 2.6 feet.

* Middle River. Middle River has its source in Guthrie County, Iowa, flows generally in an easterly direction to its confluence with the Des Moines River approximately 17 miles downstream from Des Moines. Its length is approximately 105 miles and it drains an area of about 560 square miles. The average slope of the river is 5.7 feet per mile.

* South River. South River has its source in Clarke County, Iowa, flows northeasterly to its confluence with the Des Moines River approximately 19.7 miles downstream from Des Moines, Iowa. Its length is approximately 55 miles and it drains an area of about 590 square miles. The average slope of the river is 7.3 feet per mile.

REGIONAL PROFILES

5. Regional sketches are used in this section to provide a more in-depth view of the resources of the basin. Each regional sketch

covers an area of the Des Moines River watershed and is based on the boundaries of existing regional planning commissions.

6. A sketch of the basin is the accumulation of initial planning efforts performed by the regional groups. There is an attempt to assimilate this regional data into a basin planning sketch.

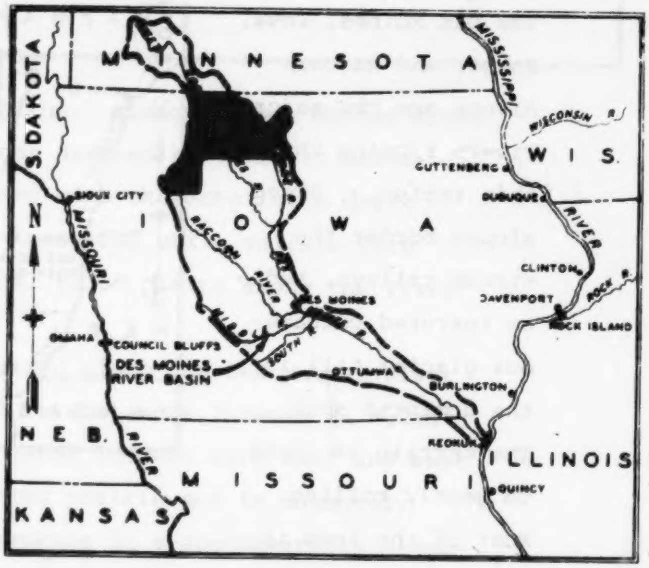
ENVIRONMENTAL SETTING AND NATURAL RESOURCES

7. The rich farmland of the basin is the most important resource in the Des Moines River Basin. Bituminous coal, once mined in 15 watershed counties is now mined in only six. From more than 9 million tons in 1917, production dropped to less than 1 million in 1967. Gypsum mines, in the vicinity of Fort Dodge, are among the most important producers of this mineral in the United States. Clay, suitable for brick and tile, is found in many localities within the basin, and in the vicinity of Des Moines, limestone and shale are quarried for manufacture of cement. Limestone is also quarried at several points for road surfacing, for agricultural use, and as concrete aggregate. Numerous other resources, such as gravel, sand, peat, timber, fish and wildlife, are also of considerable commercial importance. There is little hydroelectric power produced on the Des Moines River and its tributaries.

8. The superficial deposits of the Des Moines River Basin are, in general, glacial in origin. The first and second periods of glaciation, the Nebraskan and Kansan, resulted in deposits of glacial till probably over the entire basin. The most recent glacial period,

the Wisconsin, left deposits over practically the entire upper portion of the basin above the city of Des Moines. South of Des Moines, the surface deposits are of Kansan till and loess, an eolian silty material. In that area the topography is mature and mostly well drained. Above Des Moines the topography is youthful, the material of the latest stage of glaciation having been so recently deposited that natural drainage is not fully developed.

REGIONS 2 AND 3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SOUTH R.
OMAHA
COUNCIL BLUFFS
DES MOINES RIVER BASIN
OTTUMWA
BURLINGTON
KEOKUK
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QUINCY
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RIVER
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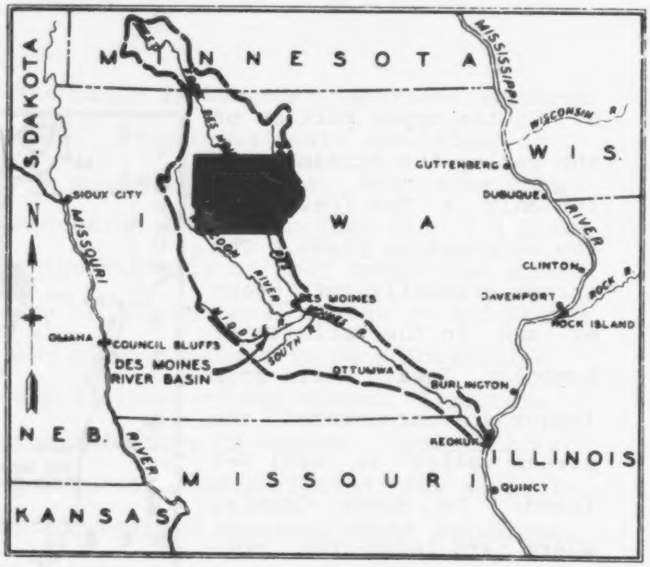
9. In the upper portion of the valley the streambed is cut only a few feet below the surrounding plain. The stream gradually cuts deeper and in the vicinity of Humboldt, Iowa, where rock ledges are encountered, the stream valley is well defined. In Boone County, where hard ledge-rock outcrops, the stream valley is narrow. Below Des Moines the valley is mature; the stream meanders through a flood plain two to three miles wide, bordered by rounded bluffs. Near Tracy, Iowa, the stream has cut limestone. In the reach between Eldon, Iowa, and the vicinity of the Atchison, Topeka, and Santa Fe Railway bridge (about river mile 20), the stream runs through a narrow rock valley.

Below this reach the flood plain becomes wider and is bordered by rounded bluffs until the stream enters the Mississippi River flood plain.

REGION 5--NORTH-CENTRAL AREA OF THE DES MOINES RIVER BASIN

10. This region comprises six counties, sixty-one municipalities, and many other special districts. The Des Moines, Iowa, Boone, and Raccoon Rivers are the major rivers flowing through this region. Steep slopes border the stream valleys. Medium textured calcareous glacial till is the dominant soil. The terrain is level to gently rolling. Most of the land is in farms with about three-fourths of this farmland in crops. Narrow bands of woodland are on steep slopes bordering stream valleys and some of the wet bottom lands are forested.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COUNCIL BLUFFS
DES MOINES RIVER BASIN
OTTUMWA
BURLINGTON
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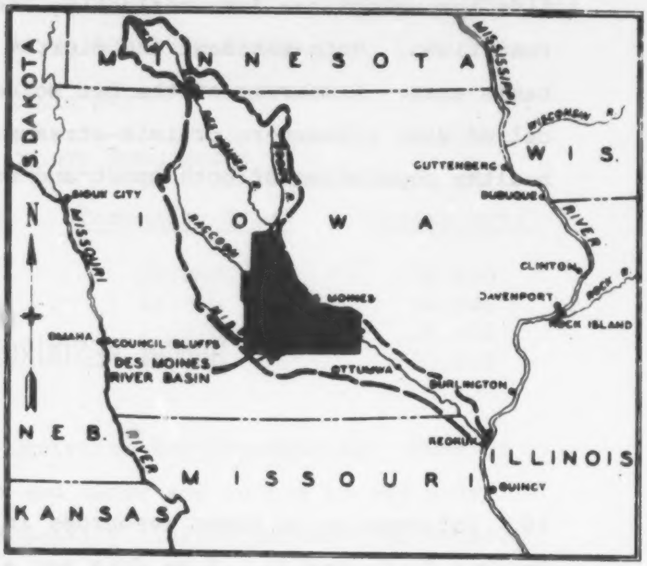
REGION 11--CENTRAL AREA OF THE DES MOINES RIVER BASIN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DUBUQUE
CLINTON
DAVENPORT
ROCK ISLAND
SIOUX CITY
OMAHA
COUNCIL BLUFFS
DES MOINES RIVER BASIN
DES MOINES
OTTUMWA
BURLINGTON
KEOKUK
QUINCY

11. This region is composed of eight counties with 97 incorporated communities. The Central Iowa Region is the most populated region in the State of Iowa.

12. The soils are drift deposits derived from parent rocks to the north. The basin is in the central lowlands which are characterized by young glaciated plains. Along the Des Moines River Basin are gently rolling uplands drained by young to mature streams. The uplands are marked with characteristic drift sheets and occasional moraine features, while valleys form bluffs and terraces with typical flood plains along the river.

13. The vegetative stands located along the Des Moines River Valley represent the one major forest range located in north-central Iowa. The expanse of lands located both east and west of the river valley is considered prairie and is intensely farmed. As the river valley extends in a southeasterly direction, the valley floor broadens into a wide expanse of rich, productive agricultural lands with gentle slopes. The permanent stands of vegetation tend to become less prevalent as the river valley expands.

14. Terrestrial and semiaquatic mammals within the basin are those common to this environment. There is a diversity of avian life throughout the area reflecting the equally diverse habitat conditions. Both resident and migrant species are found in the basin area. Fisheries of the Des Moines River are somewhat typical of most midwestern prairie streams. The river supports a healthy population of both sport and commercial fish.

HUMAN RESOURCES

15. Information on human resources in the basin is available for Regions 3, 5, and 11. Some data are also available for Kossuth County which is a part of Region 2. These county data are considered representative of the region. The analysis and display of this information is a helpful guide to understanding the character and capacity of the basin's human resources.

POPULATION CHARACTERISTICS

16. Demographic information is presented for areas 3, 5, and 11 and for Kossuth County located in area 2. This cross section of information provides a thorough coverage of the basin.

17. The population for the basin as a whole has been increasing since before 1930. Some more rural areas, however, are experiencing a decline as migration to urban areas becomes more prevalent.

REGION 2--KOSSUTH COUNTY

18. The population of Kossuth County has been variable. Table B-1 shows a population decline since the 1940 census.

Table B-1

KOSSUTH COUNTY POPULATION

Year	Rural Total	Community Total	County Total
1940	15,750	10,880	26,630
1950	14,865	11,375	26,240
1960	13,445	11,870	25,315
1970	11,045	11,890	22,935

19. Some population characteristics are interesting. Much of the population is in the 55 and older and in the 19 and under age groups. The population density is 23.5 persons per square mile, which is less than half the State's average density of 50.5 persons per square mile. The population has been migrating from the rural areas to the communities. These trends are expected to continue. The county population is expected to continue to decline but at a lower rate.

REGION 3--NORTHWEST IOWA

20. This predominately rural area includes nine counties in Northwest Iowa. Approximately 63 percent of the regional population is located in rural areas and the remaining 37 percent is located in communities of 2,500 or more. The population density is 31 persons per square mile. Population is projected to remain stable with some decrease. The larger cities should show a small growth due to outmigration from rural areas. It is predicted

that Region 3 population will decrease at a diminishing rate, reaching stability in approximately 20 years.

Table B-2

POPULATION TRENDS--REGION 3

Year	Total Urban	Total Rural	Area Total
1940	26,529	109,145	135,674
1950	32,944	103,359	136,303
1960	86,387	65,234	151,621
1970	92,193	54,240	146,433

REGION 5--NORTH-CENTRAL DES MOINES RIVER BASIN

21. As table B-3 indicates, this area experienced a slight population increase from 1950 to 1960 and a sharp decrease for the decade 1960-1970. There is a concentration of population in the 65 and older age group and a progressing decrease in the productive work force. Every county in this region experienced outmigration. This area also demonstrates a regional trend of decrease in rural population and a continuing concentration of persons in the urban areas.

Table B-3

POPULATION TRENDS--REGION 5

Year	Total Urban	Total Rural	Area Total
1940	39,456	89,334	128,790
1950	43,271	85,820	129,091
1960	51,051	79,551	130,602
1970	66,857	56,746	123,603

REGION 11--SOUTH-CENTRAL DES MOINES RIVER BASIN

22. Region 11 includes eight counties with 97 incorporated communities. It is the most populated region in the State of Iowa. Included within this planning area is the Des Moines SMSA encompassing Polk County. More emphasis is placed on this region since many existing and proposed flood control improvements are within the boundaries and since it is an area of population concentration. Also, this area is most sensitive to the impact of a flood control improvement.

23. Table B-4 and plate B-1 present population information for Region 11.

24. The Des Moines SMSA has influenced the population growth of this region. There is a decided growth in urban population and a declining rural population.

POPULATION PROJECTIONS

25. Tables B-5 and B-6 are summaries of population trends published by the Water Resources Council for the Des Moines River Basin.

26. The general trend projected by these tables is that the total basin area will increase in population and the non-SMSA area will decrease. This indicates the population growth will occur in the Des Moines SMSA area.

Table B-4

REGION 11--POPULATION CHARACTERISTICS

	1940				1950				1960				1970			
County	Urban	Rural	Total	People/ Sq Mile	Urban	Rural	Total	People/ Sq Mile	Urban	Rural	Total	People/ Sq Mile	Urban	Rural	Total	People/ Sq Mile
Boone	12,373	17,409	29,782	52.0	12,164	15,975	28,139	49.1	12,448	15,589	28,037	48.9	17,534	8,936	26,740	46.2
Dallas	5,977	18,672	24,649	41.4	6,174	17,487	23,661	39.6	6,441	17,682	24,123	40.4	17,155	8,930	26,085	43.7
Jasper	10,462	21,034	31,496	42.8	11,723	20,582	32,305	43.9	15,383	19,899	35,282	47.9	23,782	11,643	35,425	48.5
Madison	3,631	10,894	14,525	25.7	3,570	9,561	13,131	23.2	3,639	8,656	12,295	21.8	5,930	5,628	11,558	20.5
Marion	10,574	16,445	27,019	47.6	12,052	13,878	25,930	45.7	12,995	12,891	25,886	45.6	18,119	8,233	26,352	52.9
Polk	164,071	31,764	195,835	329.7	199,934	26,076	226,010	380.5	244,211	22,104	266,315	448.3	265,519	20,582	286,101	481.7
Story	15,908	17,526	33,434	58.9	26,661	17,633	44,294	78.0	31,224	18,103	49,327	86.8	53,422	9,361	62,783	110.5
Warren	4,123	13,572	17,695	30.9	5,145	12,613	17,758	31.0	7,061	13,768	20,829	36.4	15,917	11,515	27,432	49.2
TOTAL	227,119	147,316	374,435		277,423	133,805	411,228		333,402	128,692	462,094		417,378	85,098	502,476	

Table B-5

SUMMARY OF POPULATION TRENDS
1972-E OBERS PROJECTIONS
WATER RESOURCES COUNCIL--DES MOINES RIVER BASIN

	1950	1962*	1969	1970	1971	1980	1985	1990	2000	2020
Population, midyear	531,993	516,484	504,679	505,849	510,074	500,500	498,500	496,500	489,600	[illegible]
Per capita income (1967 $)	1,809	2,140	3,159	3,242	3,191	4,400	5,000	5,700	7,700	12,600
Per capita income relative (U.S.=1.00)	.88	.83	.92	.91	.90	.93	.93	.94	.95	.96
Total employment	195,275	185,378		190,054		208,700	209,100	209,600	214,700	210,100
Employment/population ratio				.38		.42	.42	.42	.44	.43

Table B-6

SUMMARY OF POPULATION TRENDS
1972-E OBERS PROJECTIONS
WATER RESOURCES COUNCIL
NON-SMSA PORTION--DES MOINES RIVER BASIN

	1950	1962*	1969	1970	1971	1980	1985	1990	2000	2020
Population, midyear	758,243	790,434	789,892	792,453	802,954	825,500	840,700	856,100	880,700	[illegible]
Per capita income (1967 $)	2,036	2,451	3,362	3,466	3,455	4,700	5,400	6,200	8,200	[illegible]
Per capita income relative (U.S.=1.00)	.99	.95	.98	1.00	.97	1.00	1.00	1.01	1.01	1.01
Total employment	290,308	293,156		314,229		362,300	371,000	379,800	404,700	[illegible]
Employment/population ratio				.40		.44	.44	.44	.46	[illegible]

27. The non-SMSA area includes State planning areas 2, 3, and 5. The population projections for these areas indicate a decline in population and a migration of populus from the rural sector to the communities.

28. A close look at area 11 including the Des Moines SMSA will provide additional validity to these projections.

29. Table B-7 is a summary of projected population for area 11.

Table B-7

PROJECTED POPULATION--AREA 11

County in Area 11	Population Projected 1970	1980	1990
Boone	26,740	25,000	23,000
Dallas	26,085	26,000	26,000
Jasper	35,425	35,800	36,000
Madison	11,558	10,500	10,000
Marion	26,352	26,000	26,000
Polk*	286,101	317,000	348,000
Story	62,783	72,000	79,000
Warren	27,432	30,500	35,000

*County Profiles
CIRALG
US Census, 1970

30. The Des Moines SMSA encompassing Polk County will steadily increase in population. Jasper, Story, and Warren Counties will increase in population. Dallas and Marion Counties will generally maintain population levels. Boone and Madison Counties will decrease in population.

DEVELOPMENT AND ECONOMY

31. The economy of the basin is largely agricultural but industrialization in major population centers is rapidly expanding. This section of the report concerns trends of development for the Des Moines River Basin. It is organized by the parameters discussed above. Region 11 is also given primary emphasis in this discussion.

ECONOMIC CHARACTERISTICS

32. A general profile of the existing economic conditions can be assumed from a display of per capita income. Table B-8 is an indicator of the economic stability and economic conditions in each region.

Table B-8

ECONOMIC GROWTH

Area	$/Capita
Average State of Iowa	$2,894
Average Kossuth County (Region 2)	2,464
Average Region 3	2,560
Average Region 5	2,910
Average Region 11	2,933

33. A more thorough analysis of Region 11 is warranted since this region encompasses the major population, manufacturing, commercial, and financial center within the basin. A number of additional economic indicators is displayed to provide an understanding of the economic stability of this area.

EMPLOYMENT

34. Table B-9 presents the labor force characteristics for each county in Region 11.

Table B-9

EMPLOYMENT

County	Percent Employed Non-Manufacturing	Percent Employed Manufacturing	Percent Employed Agriculture	Total Labor Force	Percent Unemployment*
Boone	64.6	8.6	26.8	10,150	4.1
Dallas	71.2	12.4	16.4	9,530	4.5
Jasper	47.7	13.8	38.5	15,650	4.1
Madison	66.7	6.1	27.2	4,450	4.4
Marion	70.1	11.7	18.2	11,290	2.7
Polk	72.4	19.0	8.6	238,000	2.8
Story	51.8	24.1	24.1	29,240	2.4
Warren	73.7	5.2	21.1	6,900	6.0

*State average unemployment = 3.7%

LAND USE

LAND USE

35. Land use practices of Region 11 were investigated under the direction of CIRALG (Central Iowa Regional Association of Local Governments). Table B-10 gives a synopsis of a portion of this investigation.

Table B-10

LAND USE

County	Acres Agriculture	Acres Urbanized	Acres Recreation and Open Space
Boone	313,129	15,155	2,540
Dallas	320,849	13,824	356
Jasper	416,981	12,232	2,992
Madison	282,076	22,625	652
Marion	255,323	13,694	3,636
Story	313,814	24,546	1,955
Warren	269,839	12,876	1,680

36. The Polk County land use planning has been established by the legal entities within the county. There is an effort to conduct wise land use throughout the county. Currently, there is an effort to coordinate all land use planning within the county.

ECONOMIC PROJECTIONS

37. General conclusions may be derived from an investigation of population projections and population characteristics.

REGION 2--KOSSUTH COUNTY

38. Agricultural employment is expected to decline although agriculture will remain the major basic economic activity. This indicates a continuation of migration from rural to urban localities. A generally recognized possible future action is to attempt to attract additional industries to this area to provide jobs for the migrating population and thus to provide stability to a projected population decrease.

REGION 3--NORTHWEST IOWA

39. The population of Region 3 is declining; however, the decline is projected at a decreasing rate reaching stability in approximately 1990. A recent inventory of business and sales revealed an increase in the number of businesses and in gross sales. Generally, the economic conditions remain stable and have improved through the decrease of low income families. The financial situation in the region should continue to be stable. There is a concern for a decrease in population caused by the outmigration of persons in the work force age group. Lack of sufficient job sources is a problem in this area and will continue to be a problem with the decline in rural jobs.

REGION 5--NORTH-CENTRAL DES MOINES RIVER BASIN

40. The availability of rural jobs is decreasing causing a demand for job opportunity in the urban areas. However, there

has been a slight decrease in the number of business firms in the area. The vibrant businesses have experienced a steady growth in sales because of this decrease in firms.

REGION 11--SOUTH-CENTRAL DES MOINES RIVER BASIN

41. This area is economically sound. The indications are that this area will remain vibrant and will continue as a hub of economic activity in this section of the State. Growth in real per capita income is a target indicator. The projected growth for this parameter is discussed here for the satellite counties surrounding the Des Moines SMSA, Polk County. The projected regional per capita income indicates a steady increase. Polk, Story, and Jasper Counties' per capita income should equal or slightly exceed the projected regional value. The remaining counties in this region will approach the regional value with Madison, Marion, and Warren Counties achieving a value below the regional.

42. Table B-11 gives the OBERS, Series E projections regarding economic parameters for the basin and table B-12 gives the projections for the non-SMSA portion of the basin. These indicate a steady economic growth for the basin.

LAND USE AND RECREATION

43. There is an identified need for sound land use throughout the Des Moines River Basin. Area 5 and area 11 have specified

Table B-11

SUMMARY OF ECONOMIC FACTORS
1972-E OBERS PROJECTIONS
WATER RESOURCES COUNCIL--DES MOINES RIVER BASIN

In Thousands of 1967 Dollars

	1950	1962*	1969	1970	1971	1980	1985	1990	2000	2020
Total personal income	1,543,772	1,937,170	2,655,451	2,746,721	2,773,845	3,944,100	4,578,000	5,313,700	7,264,500	12,519,600
Total earnings	1,295,759	1,549,780	2,111,261	2,160,983	2,157,006	3,060,500	3,538,000	4,090,100	5,558,300	9,534,200
Agriculture, forestry and fisheries	382,015a	233,570a	305,183a	330,103a	266,755a	345,300	365,900	387,800	442,300	574,200
Agriculture						345,300	365,800	387,700	442,200	574,100
Forestry and fisheries						(S)	(S)	(S)	(S)	(S)
Mining	3,924b	2,974b	3,999b	5,187b	5,226b	8,200	8,800	9,500	11,100	14,800
Metal										
Coal						(S)	(S)	(S)	(S)	(S)
Crude petroleum and natural gas						(S)	(S)	(S)	(S)	(S)
Nonmetallic, except fuels						7,300	7,900	8,600	10,100	13,600
Contract construction	71,798	77,953	126,034	119,129	123,627	162,300	186,600	214,700	286,600	470,200
Manufacturing	187,321	301,599	444,451	436,618	446,083	623,200	720,700	833,300	1,107,300	1,816,300
Food and kindred products						132,700	143,000	154,100	181,100	244,400
Textile mill products						(S)	(S)	(S)	(S)	(S)
Apparel and other fabric products						5,500	5,900	6,400	7,500	9,700
Lumber products and furniture						17,700	20,200	23,100	29,600	45,400
Paper and allied products						16,400	18,800	21,700	28,100	44,400
Printing and publishing						64,600	72,800	82,100	107,000	171,200
Chemicals and allied products						34,200	42,800	53,600	80,500	155,600
Petroleum refining						1,200	1,400	1,600	2,200	3,400
Primary metals						11,500	12,100	12,700	14,400	18,600
Fabricated metals and ordnance						32,300	36,300	40,700	50,200	71,000
Machinery, excluding electrical						125,900	145,800	168,700	220,000	346,700
Electrical machinery and supplies						18,500	23,700	30,400	47,000	94,800
Motor vehicles and equipment						1,700	2,000	2,300	3,200	5,400
Transportation equip., excl. mtr. vehs.						15,900	18,100	20,500	25,500	37,100
Other manufacturing						144,300	176,000	214,700	310,200	567,600
Trans., comm. and public utilities	105,717	122,493	145,231	149,513	159,488	226,300	259,900	298,500	402,000	677,200
Wholesale and retail trade	259,082	307,253	378,131	385,900	389,929	522,100	580,700	645,900	839,700	1,325,400
Finance, insurance and real estate	67,564	110,159	151,594	148,398a	158,227	246,600	297,000	357,600	518,100	961,800
Services	115,369	202,902	279,458	292,013	297,857	511,800	631,200	778,500	1,173,400	2,324,200
Government	97,821	185,022	269,910	288,430	304,242	414,200	483,300	564,000	777,400	1,367,000
Federal government	28,641	44,712	57,858	64,704	68,147	96,100	113,000	132,900	181,700	337,600
State and local government	63,749	133,155	203,200	214,540	225,734	307,200	358,300	417,800	579,300	1,004,300
Armed forces	5,425	7,160	8,853	9,186	10,360	10,800	12,000	13,300	16,300	25,000

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*Employment is for 1960.
a—represents 80.0 to 99.9 percent of the true value
b—represents 60.0 to 79.9 percent of the true value
c—represents 40.0 to 59.9 percent of the true value
d—represents 20.0 to 39.9 percent of the true value
e—represents zero to 19.9 percent of the true value

Table B-12

SUMMARY OF ECONOMIC FACTORS
1972-E OBERS PROJECTIONS
WATER RESOURCES COUNCIL
NON-SMSA PORTION--DES MOINES RIVER BASIN

In Thousands of 1967 Dollars

	1950	1962*	1969	1970	1971	1980	1985	1990	2000	2020
Total personal income	962,208	1,105,061	1,994,111	1,639,870	1,627,765	2.222,100	2,527,400	2,874,700	3,784,600	6,141,800
Total earnings	786,793	818,989	1,137,285	1,159,103	1,123,120	1,526,800	1,738,000	1,978,400	2,612,700	4,292,300
Agriculture, forestry and fisheries	365,020a	226,474a	293,821a	317,491a	256,875a	321,900	341,300	361,900	412,600	519,200
Agriculture						321,800	341,300	361,900	412,600	519,200
Forestry and fisheries						(S)	(S)	(S)	(S)	(S)
Mining	1,731c	1,676c	2,019c	1,294c	3,232c	6,400	6,900	7,600	9,000	12,900
Metal										
Coal						(S)	(S)	(S)	(S)	(S)
Crude petroleum and natural gas						(S)	(S)	(S)	(S)	(S)
Nonmetallic, except fuels						5,400	6,000	6,600	8,100	11,400
Contract construction	35,961	39,522	63,806	52,897	56,613	76,500	87,300	99,600	131,200	211,600
Manufacturing	74,432	140,154	220,945	218,553	221,762	302,100	347,900	400,700	529,400	862,000
Food and kindred products						103,900	112,900	122,600	146,000	201,100
Textile mill products										
Apparel and other fabric products						3,700	4,100	4,300	5,400	7,300
Lumber products and furniture						11,800	13,400	15,300	19,600	30,100
Paper and allied products						7,500	8,600	9,800	12,800	20,600
Printing and publishing						11,200	12,800	14,600	19,200	30,700
Chemicals and allied products						25,600	32,800	41,900	64,700	129,000
Petroleum refining						900	1,100	1,300	1,700	2,800
Primary metals						11,200	11,800	12,500	14,300	18,900
Fabricated metals and ordnance						10,500	12,700	15,200	21,000	35,000
Machinery, excluding electrical						56,600	67,900	81,300	111,600	198,700
Electrical machinery and supplies						18,100	23,300	29,900	46,400	94,100
Motor vehicles and equipment						1,100	1,400	1,700	2,500	4,500
Transportation equip., excl. mtr. vehs.						3,800	4,200	4,700	5,800	8,400
Other manufacturing						35,500	39,800	44,600	57,800	91,700
Trans., comm. and public utilities	46,434	42,774	63,930	65,363	68,087	101,200	116,400	133,800	181,200	310,600
Wholesale and retail trade	131,466	143,159	181,535	183,094	187,535	234,300	259,700	280,000	372,300	579,700
Finance, insurance and real estate	12,028	21,098	33,858	31,873a	33,161	51,900	62,400	75,100	108,800	201,500
Services	58,435	95,011	140,107	133,749	135,237	217,700	262,200	315,900	457,500	851,400
Government	56,137	103,246	139,995	147,098	155,028	214,700	251,900	295,500	410,200	724,600
Federal government	12,875	21,131	25,219	26,851	28,671	38,800	44,800	51,800	68,800	122,700
State and local government	39,871	78,100	109,541	114,808	120,657	170,000	200,400	236,300	332,300	587,400
Armed forces	3,385	4,020	5,213	5,439	5,699	5,800	6,500	7,300	9,100	14,300

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d—represents 20.0 to 39.9 percent of the true value

e—represents zero to 19.9 percent of the true value

a projected shortage of recreational land. The dedication of land to various uses is a consideration currently under review on a State and regional basis.

DESCRIPTIVE PUBLICATIONS

* Saylorville Lake, Final Environmental Statement.

* Background for Planning, Kossuth County, Iowa. Prepared by Stanley Consultants.

* State of the Region, 1974, Area 3, State of Iowa. Northwest Iowa Regional Council of Governments.

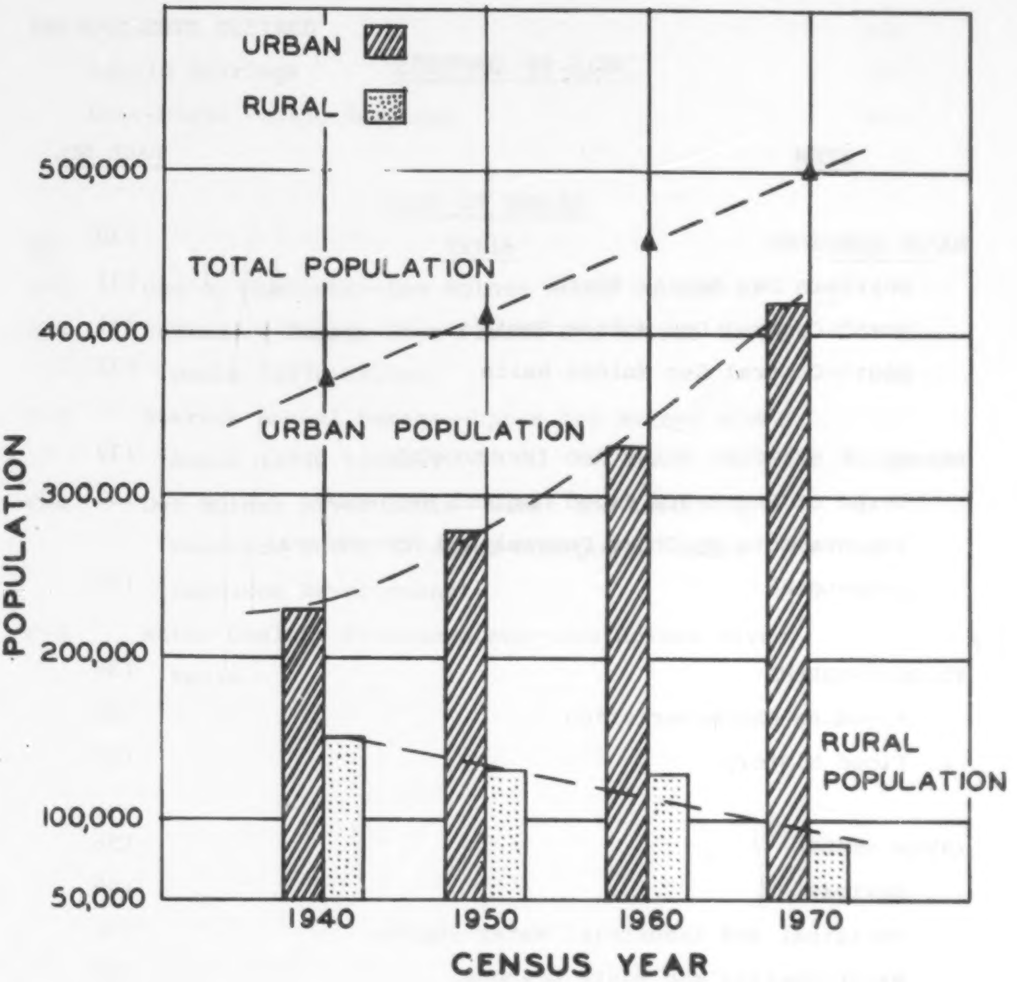
* Region 5 Development Guide, Region 5 - State of Iowa. MIDAS Regional Planning Commission.

* Demographic and Economic Base, Survey and Analysis. Area 5 Substate Planning District.

* US Water Resources Council, 1972 Obers Projections, Series E, Volumes 3 and 7.

* Central Iowa Regional Association of Local Governments, County Profiles, 1974.

* Department of Commerce, 1970 Census of Population, State of Iowa.



REGION II, POPULATION CHARACTERISTICS

PLATE B-1

SECTION C

PROBLEMS AND NEEDS

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SECTION C

PROBLEMS AND NEEDS

1. In studying water and land resource problems for any area, the first step taken is problem identification, a process which establishes and analyzes the range of problems for the study area. This section of the report identifies and evaluates publicly expressed resource management problems and concerns and presents technical data which further identifies the problems, issues, concerns, and needs of the area. It is a summary of the existing conditions in the study area and it verifies actual and potential resource management problems.

BASIN CONCERNS

2. A review of demographic and economic parameters was made to identify and summarize public concerns within the basin. The Des Moines River Basin has been investigated on the basis of the planning regions that comprise the basin area. A summary of the concerns and issues existing within the basin is organized on this basis.

NORTHERN DES MOINES BASIN

3. Region 3 and portions of Region 2 comprise this basin area. This area has a declining population which is predicted to continue. A shift of population from rural to urban is also occurring. The residents of this area are faced with the challenge to decrease the outmigration of work force age persons. The economic stability of the area will be dependent upon the ability to maintain existing basic industries. Agriculture comprises the primary business activity. Industries which rely on agricultural raw materials or rural service businesses dominate the economic activity. There are localized flooding problems throughout this area but regional attention has not focused on this problem.

NORTH-CENTRAL DES MOINES BASIN

4. A regional profile of this area reveals an effort to preserve the balance between agriculture and industry. Germane to water resources there are some basic planning implications that are reasonable objectives for this area. The rivers and streams within this area are important sources of recreational activities. To enhance water related recreation an effort to abate pollution is a regional issue. Periodic flooding within flood plains has intensified the need for flood protection and flood plain zoning. Periodic flooding has also deterred the intensification of land use in the flood plains. Siltation caused by eroded farmland is a concern within the region. There is an effort to guide development to those lands not considered prime agricultural areas.

There is some mining in this area which has centered attention on wise mining practices to avoid misuse of land.

SOUTH-CENTRAL DES MOINES BASIN

5. This area is actively involved in regional planning. An overall regional objective has been defined as promoting orderly planned growth of the region and of communities and preserving prime agricultural land in the region. The natural resource objectives of this region have been identified. They are the preservation of environmental quality and the conservation of natural resources. In terms of recreation and open space, there is a goal to increase the quality and availability of recreational opportunities.

STATUS OF EXISTING PLANS AND IMPROVEMENTS

CORPS OF ENGINEERS FLOOD CONTROL PROJECTS

6. The Corps of Engineers has completed or has under construction a number of flood control projects within the Des Moines River Basin.

RED ROCK DAM AND LAKE RED ROCK

7. The Red Rock project is now in operation on the Des Moines River at Howell, Iowa, about 60 miles downstream from the city of Des Moines. The project was authorized for construction by the Chief of Engineers under the general authorization contained in the Flood Control Act approved 28 June 1938 and by the Flood Control Act approved 22 December 1944. The reservoir will store flows of the Des Moines River temporarily during flood periods. Releases from the reservoir will be regulated to reduce flood damage along the Des Moines River downstream from the dam and along the Mississippi River below the mouth of the Des Moines River. Significant recreation and fish and wildlife benefits will be realized from the land area acquired for the reservoir, from the permanent pool and from the wildlife refuge which is to be administered by the State of Iowa. The project was placed in beneficial use for storage of floodwater in January 1969.

SAYLORVILLE LAKE

8. The Saylorville Dam is now under construction on the Des Moines River, at river mile 231.7, about 6 miles upstream from the upstream city limits of Des Moines. The flood control reservoir will lie in Polk, Dallas, and Boone Counties. The project was authorized in the Flood Control Act of 1958. Its principal function will be to store floodwaters, supplementing the capacity of Lake Red Rock. As the Saylorville Dam will be located only a few miles upstream from the city of Des Moines, it will exercise a high degree of control over Des Moines River flood flows through that city. A conservation pool of some 5,550 acres in surface area will be part of the project,

providing an important public recreational area for central Iowa. In times of low flow in the Des Moines River, water will be released from the conservation pool as needed to maintain a minimum flow of 200 c.f.s. at the Second Avenue gage in Des Moines. The dam is scheduled for closure after 1 July 1975 and will be operational in December 1975.

DES MOINES LOCAL FLOOD PROTECTION PROJECT

9. The Des Moines, Iowa, Local Flood Protection Project was authorized under the Flood Control Act approved 22 December 1944. This project along with the authorized Saylorville Lake will provide a high degree of protection for the city of Des Moines from floods on the Des Moines River. The project includes the construction of levees, floodwalls, and ramps, and modification of existing structures where necessary to protect the project area from design flood conditions. Construction of the Des Moines Local Flood Protection Project was completed in November 1971.

OTTUMWA, IOWA

10. House Document No. 197, Ninety-second Congress, second session, contains a report on flooding from the Des Moines River in the main business district of Ottumwa, Iowa. The report recommended improvement of the discharge efficiency of an interceptor sewer by provision of additional gated openings. Preconstruction planning is in progress.

DES MOINES AND MISSISSIPPI LEVEE DISTRICT NO. 1

11. This district was organized by private interests in about 1870. Approximately 16 miles of levee protect the district from Des Moines River, Mississippi River, and Fox River floods. The levees have been repaired and/or improved several times, often with United States Government assistance. The latest Federal improvement, authorized by the Flood Control Act of 1954, was completed in 1968 at a total project cost of $1,492,000.

SECTION 205, 1948 FLOOD CONTROL ACT

12. Local flood control projects at Van Meter, Iowa, and Worthington, Minnesota, were constructed under authority of this act.

OTHER WORKS

13. The only other existing Corps of Engineers work of any consequence on the Des Moines River is a channel cutoff between miles 1.3 and 3.7. The cutoff was completed in January 1943 at a cost of about $60,000.

IMPROVEMENTS BY OTHER FEDERAL AND NON-FEDERAL AGENCIES

14. The Des Moines and Mississippi Levee District No. 1, organized by private interests in about 1870, now maintains some 16.1 miles

of levee protecting almost 11,000 acres of fertile land in Clark County, Missouri, from floods on the Fox, Mississippi, and Des Moines Rivers. The system has been improved, strengthened, repaired, and extended a number of times. This early work was conducted by private interests; the Federal Government has assisted in later improvements and repairs.

15. The Parsons Levee District in Lee County, Iowa, approximately 1.5 miles upstream from the mouth of the Des Moines River, was established in 1912. It consists of 1.6 miles of levee protecting 232 acres of bottom land.

16. The Des Moines River flood plain in Ottumwa has been protected by levees and concrete walls provided by the city. The consulting engineer adopted the 1947 flood as the design flood and two feet of freeboard were provided. Interior drainage problems on the left bank were investigated under a separate authorization, a resolution adopted 5 October 1966 by the Committee on Public Works of the House of Representatives.

17. A local protection project for Eddyville, Iowa, was completed in 1960 and constructed entirely with city funds. Eddyville is on the Des Moines River 30 miles downstream of Red Rock Dam.

18. Approximately 5.5 miles of levee had been constructed along the Des Moines and Raccoon Rivers within the city limits of Des Moines. The levees were originally built to a grade 2 to 3 feet above the high water of 1903. The levees were not maintained and flooding resulted in 1947 from high water of about the same magnitude as occurred in 1903. Following the 1947 high water, local interests raised and strengthened the levees, but

the work did not bring the levees to a uniform grade or section. A new mouth for the Raccoon River was dredged about 2,000 feet downstream from its former outlet to decrease backwater effects from the Raccoon River in the heart of the city during high water stages. Other works within Des Moines include a short cutoff channel across a loop in the Des Moines River just below the city, an old power dam known as the Center Street Dam, and a low-head dam at Scott Street with reinforced concrete river walls extending upstream from it. These works, with the exception of Center Street dam, were constructed by the city of Des Moines and the Works Progress Administration.

19. Considerable uncoordinated effort has been spent on more than 20 small projects along the Des Moines River between its mouth and Madrid, Iowa. The work consists mainly of low embankments to retard overbank flows of the more frequent floods for the purpose of preventing sheet erosion on the bottom lands, and short cutoffs or other minor channel changes.

20. Scattered throughout the Des Moines River Basin are numerous Works Progress Administration projects for the establishment of new lakes and the restoration or raising of levels of existing lakes. Many small works, such as dikes, revetments, retards, dams, and diversion channels were also constructed by or in cooperation with the WPA.

21. There have been at least 93 low-head waterpower developments in the Des Moines River Basin, of which two, with a total installed capacity of 3,800 horsepower, are still in operation.

22. Within the Des Moines River Basin, the Soil Conservation Service has several watershed projects in various stages of planning or completion, under authority of Public Law 566.

FLOOD PROBLEMS

23. Periodic flooding in the Des Moines River Basin has caused varying degrees of urban damage and crop loss. It may occur from the Des Moines River itself or from its many tributary streams. Much of the damage has been predominantly agricultural. Although the population of the basin has been increasing slowly, urban communities with populations greater than 5,000 have increased at a rate four times that for the basin as a whole. This accelerated increase indicates increased usage of the flood plain in the urban areas and progressively higher damage from future floods than from past floods of equal magnitude. Appendix I, Flood Control, of the Upper Mississippi River Comprehensive Basin Study (UMRCBS) identifies the Des Moines River Basin as flood prone.

FLOODING CHARACTERISTICS

24. The more severe flood problems occur along the West Fork Des Moines River, upstream from Humboldt; the Des Moines River, downstream from the Saylorville damsite; the Raccoon River in Polk, Dallas, and Greene Counties; Beaver Creek in Polk and Dallas Counties; Walnut Creek through the city of West Des Moines; Boone River at Webster City; and Fourmile Creek in the city of Des Moines. Other problems were reported on the East Fork Des Moines River and Lizard Creek. Flooding of lands during the growing season (May through October) causes damage to crops

grown on the flood plain. The most severe damage occurs usually in spring and summer. Major floods cause damage to industrial, commercial, and residential properties in urban areas and to transportation facilities in both urban and rural reaches.

DES MOINES RIVER

25. The Des Moines River rises in southwestern Minnesota and flows southeasterly 535 miles to its junction with the Mississippi River just downstream from Keokuk, Iowa, at Mile 361.4 above the mouth of the Ohio River.

TRIBUTARY STREAMS

26. Des Moines River has numerous tributaries, many of them very short and with small drainage areas. Tributaries which are considered in this study include:

27. West Fork, Des Moines River. This tributary of the Des Moines River has its source in Murrary County, Minnesota. It flows southeasterly and enters the Des Moines River approximately 14 miles upstream from Fort Dodge, Iowa.

28. Boone River. This stream has its source in Hancock County, Iowa, flows southwesterly and joins the Des Moines River approximately 24 miles upstream from Boone, Iowa. Its length is

approximately 100 miles and it drains an area of about 900 square miles. The average slope of Boone River is 3.0 feet per mile. Damages from Boone River flooding are generally rural with Webster City suffering urban damages.

29. Raccoon River. This stream has its source in Buena Vista County, Iowa, flows southeasterly for approximately 210 miles, and enters the Des Moines River within the city limits of Des Moines, Iowa. Its watershed area is approximately 3,640 square miles. The average slope per mile of stream is 2.6 feet.

30. The South Raccoon and Middle Raccoon are tributaries of the Raccoon. Flooding along these streams is predominantly to cultivated or pastureland. Urban property damage is minor except in Des Moines, West Des Moines, and Adel.

31. Walnut Creek is another tributary of the Raccoon River. Highly developed parts of Des Moines, West Des Moines, and the suburbs of Windsor Heights and Cleve lie within this flood plain. Extensive urban property damage occurs from overbank flow of this stream.

32. Fourmile Creek runs through the city limits of Des Moines. Upstream from the city some agricultural damage occurs. Within the city limits where residential development is more intense,

some property damage and temporary evacuation occur. Several areas along this reach need flooding relief.

33. North River originates in Madison County, southeast of Des Moines, and empties into Lake Red Rock. The land is basically agricultural and damage along the stream is to crops or pasture.

34. The Lower Reaches of Whitebreast Creek are also within the limits of Lake Red Rock. Damage along this stream is also primarily to cropland and pastureland.

35. Middle River has its source in Guthrie County, Iowa, flows generally in an easterly direction to its confluence with the Des Moines River approximately 17 miles downstream from Des Moines. Its length is approximately 105 miles and it drains an area of about 560 square miles. The average slope of the river is 5.7 feet per mile. Several miles of the lower reaches form parts of Lake Red Rock.

36. South River has its source in Clarke County, Iowa, flows northeasterly to its confluence with the Des Moines River approximately 19.7 miles downstream from Des Moines, Iowa. Its length is approximately 55 miles and it drains an area of about 590 square miles. The average slope of the river is 7.3 feet per mile. This stream also empties into Lake Red Rock and forms part of the lake.

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36. South River has its source in Clarke County, Iowa, flows northeasterly to its confluence with the Des Moines River approximately 19.7 miles downstream from Des Moines, Iowa. Its length is approximately 55 miles and it drains an area of about 590 square miles. The average slope of the river is 7.3 feet per mile. This stream also empties into Lake Red Rock and forms part of the lake.

37. Other streams within the basin include East Fort Des Moines River, Bear Creek, Cedar Creek, Sugar Creek, Big Cedar Creek, and North Lizard Creek.

FLOOD HISTORY

38. There are 27 gaging stations on streams within the Des Moines River Basin for which flow records are available. Table C-1 shows record streamflow data for several stations within the basin.

39. Newspaper files and historical records indicate that prior to 1903, major floods occurred in June 1851, June 1858, April 1862, June 1865, July 1869, July 1875, April 1876, July 1881, April 1888, May 1892, April 1897, and July 1902. Of these the June 1851 apparently was the greatest and most destructive. Basinwide, the floods of June 1903 and June 1947 were by far the most damaging since 1851. The 1944 flood was very severe in the basin below Des Moines. Record flows for most stations between the headwaters and Humboldt, Iowa, were observed in April 1969. The area between Humboldt and Des Moines experienced record flows in June 1954. Smaller crests but larger volumes were experienced in 1965.

40. Historical records and gage records indicate that major floods have, in general, occurred between May and July, when heavier rainfall occurs. Although rises have been recorded in March and April, crest flows have not been comparable to those of the May and June floods. The March and April floods, in general, result from snow and icemelt augmented by moderate rainfall during the spring breakup.

Table C-1

GAGING STATIONS
Des Moines River Watershed

Station (1)	Stream	Drainage Area (sq. mi.)	Period of Flow Record		Maximum Observed Flow			Avg Flow cfs (3)	Minimum Flow(4) cfs(3)	Elevation Gage Zero (5)
			From	To	Date	cfs (2)	Gage Height (feet)			
Estherville, Iowa	West Fork Des Moines R.	1,372	Oct 1951	Date	4/12/69	16,000 (6)	17.68 (6)	254	0.2	1,247.55
Boone, Iowa (7)	Des Moines R	5,511	Dec 1904	Sep 1969 (8)	6/22/54	57,400	25.35	1,621	17 (9)	872.16
Jefferson, Iowa (10)(7)	North Raccoon R.	1,619	Mar 1940	Date	6/23/47	29,100	22.3	597	0.6	967.09
Van Meter, Iowa (7)(10)	Raccoon R.	3,441	Apr 1915	Date	6/13/47	41,200	21.77	1,189	10	841.16
Des Moines, Iowa (below Raccoon R) (10)	Des Moines R.	9,879	Apr 1940	Date	6/26/47	77,000	21.6 (11)	3,698	55	762.52
Keosauqua, Iowa (7)(10)	Des Moines R.	14,038	May 1903	Date (12)	6/01/03	146,000	27.85	5,158	40	557.36

(1) Unless otherwise noted, gages are maintained and operated solely by US Geological Survey.
(2) Maximum instantaneous discharge, unless otherwise noted.
(3) Record as published in 1968 USGS WSP.
(4) Minimum instantaneous flow observed unless otherwise noted.
(5) Unless otherwise noted, elevation based on sea level datum of 1929.
(6) From provisional flow sheets supplied by Iowa City US Geological Survey.
(7) Operated in cooperation with the US Weather Bureau.
(8) Gage not in operation from Oct 1927 thru Sep 1933. Flow record discontinued Sep 1969.
(9) Minimum mean daily.
(10) Operated in cooperation with the Corps of Engineers.
(11) High water mark outside; inside gage read 20.8 feet.
(12) Gage not in operation from Aug 1906 thru Mar 1910.

The only notable winter flood, caused by abnormally heavy rains on melting snow and resulting in an ice breakup, occurred in January 1946.

RECORD FLOODS

41. The Flood of 1851 was one of the greatest floods on the Des Moines River. Flooding was not confined to the Des Moines River Basin but occurred on most of the rivers in the State. Intermittent heavy rainfall continued for more than six weeks resulting in a series of severe flood waves.

42. The June 1903 Flood stage exceeded that for 1851 by several feet at Keosauqua. The storm series producing this flood followed the same general pattern as that for 1851. Several weeks of extremely wet weather were climaxed by heavy rainfall between 24-31 May. Precipitation was fairly uniform over the entire watershed although the greatest intensities were reported in the central part of the basin. Flooding in 1903, as in 1851, was not confined to the Des Moines Basin, but occurred on a number of other watersheds. Severe flooding occurred on the Mississippi River. Prior to the floods of 1944 and 1947 the peak discharge of the 1903 flood at Keosauqua had been estimated as 97,000 c.f.s. by the US Geological Survey. Discharge measurements made during the floods of 1944 and 1947 indicated that the peak discharge of the 1903 flood at Keosauqua has been revised to 146,000 c.f.s. The crest flow at Tracy has been estimated to be 125,000 c.f.s.

43. The Flood of June 1947 exceeded all previous records at many points within the Des Moines Basin. This flooding was caused by

several bursts of moderately heavy and comparatively widespread rainfall. Heaviest rainfall concentrations were over areas south and west of Des Moines and immediately west of Fort Dodge, Iowa. Prior to these storms, intermittent rainfall occurred from 12 May through 31 May. This resulted in a total average precipitation of approximately 0.5 to 2 inches more than the normal May accumulation over the lower and central portions of the Des Moines Basin. Flooding in June 1947 was widespread. Several weeks of regional storms caused many tributaries to reach record or near record stages. Mississippi River stages in some areas also reached record levels.

44. The Flood of June 1954 exceeded many prior records at and upstream from the gage at 2nd Avenue, Des Moines, located 2.8 miles above the confluence of the Raccoon and Des Moines Rivers. A series of thunderstorms developed over the Upper Des Moines Basin from 1 to 21 June. A severe thunderstorm began on 17-18 June in the Spencer-Estherville area, culminating with 5.63 inches in 24 hours at Fort Dodge (unofficial reports of 7-8 inches) reported on the morning of 21 June. From 18-22 June, Britt, Iowa, in the headwaters of the Boone River, reported 11.91 inches of rain. The major rise on the Des Moines River, arriving at Fort Dodge simultaneously with severe local thunderstorm activity, produced record-breaking stages and flows from Fort Dodge to Des Moines. Crest flows from the Raccoon River at Van Meter peaked on 25 June at 20,800 c.f.s. The Des Moines River at 2nd Avenue, Des Moines, crested on 24 June at 60,200 c.f.s., while the combined Raccoon-Des Moines flow crested at Des Moines (Scott Street gage) at 67,300 c.f.s., on 24 June. Flow contributions from the area downstream from Des Moines were negligible, with Tracy cresting on 27 June at 69,900 c.f.s., and Ottumwa cresting on 28 June at 61,400 c.f.s.

45. The 1965 Flood Season produced many new records in the Upper Mississippi Basin. The Des Moines River contributed nearly 80,000 c.f.s. at Keosauqua and added to the severe flooding on the Mississippi. The significant feature of the rain and snowmelt flood, however, was the record volume on the Des Moines River above Des Moines. The April 1965 volume (Saylorville gage) was 693,410 c.f.s.-days, representing 4.41 inches of runoff from the basin.

46. The Spring Flood of 1969 found the West Fork Des Moines River experiencing the greatest flooding on record, both in peak discharge and in volume. The extreme flooding was confined to the upper quarter of the basin above Fort Dodge, Iowa. The upland flooding was caused by a combination of an extremely wet fall followed by one of the most severe winters on record for the northern portion of the district in terms of icing conditions, below-normal temperatures, and unusually heavy snow accumulations (up to 60 inches by March 1969).

47. The Raccoon River Basin, in general, contributes to the Des Moines Basin flood problem. Thus, the general discussion for the 1947, 1954, and lesser floods are applicable to the Raccoon Basin. The flood of July 1958 was generated by a 4-day rainfall, 1-4 July, 8.96 inches at Guthrie Center, 6.64 inches at Van Meter, and 5.82 inches at Perry. Record flooding occurred at Middle Raccoon River at Panora and South Raccoon River at Redfield.

FLOOD DAMAGE

48. Damage varies in magnitude in both rural and urban areas. A given flood may be severe in a certain reach or reaches and quite moderate in others.

49. The principal damage in the Des Moines River Basin is agricultural except for the cities of Des Moines and West Des Moines along the Raccoon River, Walnut Creek, and Fourmile Creek where urban damage occurs.

50. The flood of 1974 in the North River Basin is the flood of record. There were 20,670 acres inundated resulting in damages of $2,179,800.

51. Table C-2 shows what damages from historical flooding would be based on 1970 prices.

52. Damage surveys were made and developed to determine the extent of flood damages on an average annual basis. For the survey, the basin was divided into reaches. Table C-3 shows the reaches and indicates the estimated average annual damage figure for each reach.

53. In the reach downstream from and including the city of Des Moines, flood damage has been largely eliminated by the construction of the Red Rock and Saylorville projects and the local protective works in the city of Des Moines. In addition to these projects, locally provided protective works at Eddyville and Ottumwa give a very high degree of security from floods at those localities. The two reservoirs will provide average annual benefits in excess of $6,000,000, which is about 95 percent of the average annual damage experienced in the lower valley before operation of the Red Rock project.

Table C-2

Estimated damage From Floods Des Moines River Basin
(1970 Prices)

Stream and Location of Damage	Area Flooded in Acres			Crop & Pasture	Property	Crop & Pasture	Property	Property	Property	Crop & Pasture	Property	Crep & Pasture	Property
	Total	Cultivated	Pasture										
Des Moines River	June 1947					June 1954		Apr. 1951	Mar. 1960	April 1969		June-July 1969	
Reach No. 7 Lehigh Fort Dodge	3,192	1,571	354	$131,000	$ 4,600 39,060 1,480,640	$129,000	$ 47,150 34,300 422,380	$ 5,175	$ 1,380	$ 32,600	$ 6,000 32,400(1)	None	$ 700 None
West Fork	June 1953							Mar. 1960	Apr. 1952	April 1969		June-July 1969	
Reach No. 8 Humbolt Emmetsburg	12,209	7,729	3,723	$454,000	$ 141,450			$201,250	$124,200	$200,750	$ 25,600 175,100(2) 114,100(3)	$528,000	$16,100 None None
	June 1953					June 1959		Apr. 1951	Apr. 1960	April 1969		June-July 1969	
Reach No. 9	5,885	3,276	2,314	$253,000	$ 19,550	$ 53,000	$ 3,450	$ 8,970	$ 5,750	$100,650	$ 24,000	$129,800	$ 7,700
								June 1953	Apr. 1960	April 1969		June-July 1969	
Estherville								$ 32,200	$ 4,480	None	$ 81,300(4)		None
	June 1953					June 1959		Apr. 1951	Apr. 1960	April 1969		June-July 1969	
Reach No. 10 Jackson, Minnesota Windom, Minnesota	950	276	606	$ 53,200	$ 5,060	$ 32,900	$ 2,990	$ 4,025 37,660 31,920	$ 3,450 20,440	$ 19,600	$ 5,000 174,300(5) 144,900(6)	None	None $ 2,000 None
East Fork	June 1954					May 1959		Mar. 1961	Mar. 1960	April 1969		June-July 1969	
Reach No. 11	2,234	739	1,180	$ 66,000	$ 6,900	$ 45,700	$ 3,220	$ 4,025	$ 3,450	$ 16,500	$ 13,000	None	None
	June 1954					May 1959		Mar. 1961	Apr. 1960	April 1969		June-July 1969	
Reach No. 12	7,353	2,570	4,020	$251,000	$ 19,435	$ 59,000	$ 1,840	$ 18,864	$ 15,755	$ 66,000	$ 15,200	None	None

(1) Includes $ 29,400 for Flood Fighting and Clean-up.
(2) Includes $ 26,800 for Flood Fighting and Clean-up.
(3) Includes $ 19,400 for Flood Fighting and Clean-up.
(4) Includes $ 17,900 for Flood Fighting and Clean-up.
(5) Includes $118,300 for Flood Fighting and Clean-up.
(6) Includes $ 47,900 for Flood Fighting and Clean-up.

Table C-2 (Cont'd)

Estimated Damage from Floods
Des Moines River Basin

Stream and Location of Damage	Area Flooded in Acres		Crop & Pasture	Property	Crop & Pasture	Property	Crop & Pasture	Property
	Total	Cultivated & Pasture						
Raccoon River								
	June 1947				July 1953		April 1960	
Reach No. 1	4,270	2,290	$163,404	$ 16,000	$110,290	$ 6,900	None	$ 14,400
	June 1947				June 1954		June 1958	
Reach No. 2	6,063	3,850	$220,666	$ 51,600	$147,000	$ 23,575	$160,000	$ 16,445
	June 1947				June 1954		June 1959	
Reach No. 3	6,553	5,490	$272,730	$ 25,[illegible]	$186,000	$ 17,825	$147,000	$ 4,600
							April 1960	
							$ 2,800	$ 18,000
	June 1947							
Des Moines & West Des Moines				$102,200				
	June 1947							
Adel				$ 9,800				

Table C-2 (Cont'd)

Estimated Damage from Floods
Des Moines River Basin

Stream and Location of Damage	Area Flooded in Acres								
	Total	Cultivated	Pasture	Crop & Pasture	Property	Crop & Pasture	Property	Property	Propert
Raccoon River	July 1958					June 1953		June 1957	May 1959
Reach A Guthrie Center	17,200	12,900	1,100	$ 81,700	$ 8,395 861,420	$ 76,500	$ 5,750	$ 2,300	0
Middle Raccoon River	July 1958					June 1953		June 1957	May 1959
Reach B	340	210	60	$ 17,600	$ 1,840	$ 17,500	$ 1,610	$ 690	0
Whitebreast Creek	June 1947					June 1962		July 1958	
Reach No. 1	6,724	5,573	540	$309,000	$ 34,385	$140,000	$20,700	$ 4,600	
South White-breast Creek	June 1947					June 1962		July 1958	
	830	580	120	$ 38,000	$ 4,255	$ 17,200	$ 2,530	$ 575	

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Table C-2 (Cont'd)

Estimated Damage from Floods
Des Moines River Basin

Stream and Location of Damage	Area Flooded in Acres			Crop & Pasture	Property	Crop & Pasture	Property	Property	Property
	Total	Cultivated	Pasture						
South River	June 1947					May 1959		June 1962	
Reach No. 1	6,180	5,150	350	$328,000	$ 94,300	$ 81,000	$ 3,220	0	
Reach No. 2	1,397	1,072	260	69,200	12,535	26,400	3,910	$ 1,725	
Middle River	June 1947					July 1959		Aug. 1958	
Reach No. 2	8,432	6,140	1,281	$411,600	$ 37,950	$ 96,200	$ 3,450	$ 2,300	
North River	June 1947					June 1962		Feb. 1955	Mar. 1960
Reach No. 1	4,980	3,480	700	$238,000	$ 33,005	$ 90,500	$ 11,270	$ 9,545	$10,350
Reach No. 2	3,550	2,150	580	158,500	25,300	66,000	6,900	6,325	6,900
Reach No. 3	3,350	2,300	720	163,000	19,550	25,000	3,450	2,415	2,760
North Branch, Reach No. 4	1,580	1,170	390	74,000	81,650	5,000	230	230	230
Walnut Creek	June 1947							July 1958	
West Des Moines					$371,000			$ 252,000	
Des Moines					154,000			126,000	
Windsor Heights					8,400			7,000	
Clive					11,200			9,800	
Fourmile Creek	June 1947					June 1952			June 1966
Des Moines					$315,000		$ 18,900		$60,620

Table C-3
Average Annual Damage - Upper Des Moines River Basin
(1970 Prices)

Stream		Total
Des Moines River		
Reach 7	Fraser, Iowa to Jct. East and West Forks Des Moines River	$195,549
West Fork Des Moines River		
Reach 8	Jct. East and West Forks, Des Moines to Hwy. 18 West of Emmetsburg	274,470
Reach 9	Hwy. 18 West of Emmetsburg to Iowa - Minnesota State Line	39,160
Reach 10	Iowa - Minnesota State Line to Headwaters	44,797
East Fork Des Moines River		
Reach 11	Jct. East and West Forks, Des Moines River to Humboldt-Kossuth County Line	36,260
Reach 12	Humboldt-Kossuth County Line to Tuttle Lake	182,860
Whitebreast Creek		
Reach 1	Marion-Warren County Line to Headwaters	62,688
South Whitebreast Creek	Franklin Twp., Clarke County to Greene Twp., Clarke County	7,880
South River		
Reach 1	In Warren County	44,800
Reach 2	Madison and Clarke Counties	13,460
Middle River		
Reach 2	Interstate Hwy. No. 35 to Headwaters	83,680
North River		
Reach 1	From Hwy. 65-69 to Interstate Hwy. 35	123,700
Reach 2	Interstate Hwy. No. 35 to Jct. North Branch and North River	78,300
Reach 3	Jct. North Branch and North River to Interstate Hwy. No. 80	40,480

Table C-3 (con't)
Average Annual Damage - Upper Des Moines River Basin

Stream		Total
North Branch		
Reach 4	Jct. North Branch and North River to Madison - Adair County Line	$ 8,300
Raccoon River		
Reach 1	West Des Moines City Limits to Jct. South Raccoon River	173,382
Reach 2	Jct. South Raccoon River to Dallas - Greene County Line	58,945
Reach 3	Greene County	93,209
South Raccoon River		
Reach A	Mouth to Jct. of Middle Raccoon River	102,315
Middle Raccoon River		
Reach B	Mouth to Dallas-Guthrie County Line	14,380
Walnut Creek	West Des Moines, Iowa	282,753
	Des Moines, Iowa	123,930
	Windsor Heights, Iowa	7,550
	Clive, Iowa	18,547
Fourmile Creek		154,730
TOTAL		$2,266,125

OTHER NEEDS

NAVIGATION

54. Considerations of other needs for the basin include investigating navigation, water supply, water quality, waste disposal, irrigation, recreation, and aesthetic values. The Des Moines River is officially classified as a navigable waterway but no navigation improvements have been made recently. Canalization of the Des Moines River for commercial barge traffic is considered only a very remote possibility.

55. Appendix J, Navigation, of the Upper Mississippi River Comprehensive Basin Study (UMRCBS) reports that in 1966 the Des Moines River planning area had 47,000 acres of suitable boating area. Nearly 17,000 boats having an average value of over $1,900 were registered. Estimated boating activity for 1966 exceeded 2 million recreation boating days. The demand for additional recreational boating area is expected to triple by the year 2020.

MUNICIPAL AND INDUSTRIAL WATER SUPPLY

56. While over 95 percent of the municipal water systems in the basin utilize ground water, over 50 percent of the population is served from surface sources. The major surface water users are

the cities of Des Moines and Ottumwa. Although the basin population is projected to increase 2½ times by 2020, only one municipality, Worthington, Minnesota, is expected to have a water supply problem. A plan to impound or import water may become necessary at Worthington if the present projections are realized.

57. The city of Winterset is concerned with a projected water shortage. A comprehensive county water and sewer analysis identified a water shortage for the city in the future. The city of Winterset requested the Corps to investigate the possibility of providing an alternate source of water supply furnished by a proposed reservoir on the North River Basin.

58. The present total water withdrawal for municipally supplied domestic and commercial needs exceeds 48 million gallons per day (m.g.d.) of which 23 m.g.d. is from surface sources. The total industrial water use is estimated at 85 m.g.d. It is estimated that the basin's total water requirement will increase nearly 5 times by 2020. Table C-4 shows additional needs for 1980, 2000, and 2020. The median runoff in the Des Moines River Basin is 1,720 m.g.d. or nearly three times the projected water use for the year 2020. These projected data were obtained from Appendix H, Water Quality Control, UMRCBS.

Table C-4

DES MOINES RIVER BASIN--WATER AND LAND RESOURCE NEEDS*
(WITHOUT ADDITIONAL WATER RESOURCE DEVELOPMENT)

	Units	1964	1980	2000	2020
Water Surface Area					
Recreation	1,000 ac	9	43	66	106
Fishing	1,000 ac	0	8	17	27
Aesthetic & Cultural	1,000 ac	26	26	26	26
Water Withdrawal Use					
Municipal & Industrial	m.g.d. 1/	0	54	130	225
Industrial (self-supplied)	m.g.d.	0	47	142	298
Agricultural	m.g.d.	0	24	51	634
Stream Uses					
Recreation	m.g.d.	179	179	490	490
Fish & Wildlife	m.g.d.	179	179	490	490
Quality Augmentation	m.g.d.	200	350	500	680
Pollution Damage Abutment	miles	170	170	230	270
Land Resource					
Recreation	1,000 dys	3,423	12,177	28,225	43,530
Recreation	1,000 ac	21	142	270	395
Hunting	1,000 ac	64	524	1,022	1,431
Aesthetic & Cultural	1,000 ac	2,293	2,293	2,293	2,293

*UMRCBS, Appendix Q, Draft 3.
1/ million gallons per day.

WATER QUALITY AND WASTE DISPOSAL

59. The present municipal waste load is contributed by 132 community systems serving approximately 500,000 population. Many incorporated communities are not being served by a central sewage

treatment system. Industrial organic waste discharges comprise over 75 percent of the total organic waste discharged into the basin streams. There heavy waste loads cause water quality problems in many areas. Major water quality control problem areas exist on the Des Moines River below Fort Dodge and Des Moines, Iowa, and on the Boone River below Webster City, Iowa. Other water quality problems exist on Okabena Creek below Worthington, Minnesota; Des Moines River below Estherville, Iowa; Raccoon River below Storm Lake, Iowa; and Middle Raccoon River below Carroll, Iowa. The minimum flows required at these points are shown on table C-5. Water quality problems resulting from poor agricultural practices, which increase the sediment and nutrient loadings, also exist in many streams of the basin. Good land treatment and water management measures on the individual farms would lessen these loadings appreciably. There are 170 miles of stream damaged by pollution. If not corrected, the total is projected to be 270 miles by 2020.

Table C-5

WATER QUALITY PROBLEM AREAS--DES MOINES RIVER BASIN 1/

Stream	Vicinity	Minimum Flow Needed in 2020 to Dilute Wastes That Have Been Treated to Remove 95% BOD	7-Day, 1 in 10 Year Low Flow
Des Moines River	Ft. Dodge, Iowa	150 c.f.s.	30 c.f.s.
Boone River	Webster City, Iowa	37 c.f.s.	3.1 c.f.s.
Des Moines River	Des Moines, Iowa	1,100 c.f.s.	200 c.f.s.
Okabena Creek	Worthington, Minnesota	21 c.f.s.	2/
West Fork Des Moines River	Estherville, Iowa	120 c.f.s.	1 c.f.s.
Raccoon River	Storm Lake, Iowa	180 c.f.s.	2/
Middle Raccoon River	Carroll, Iowa	46 c.f.s.	2/

1/ From UMRCBS, Appendix H.

2/ Data not available.

IRRIGATION

60. Generally, the major crops of the basin receive sufficient moisture during the growing season. In 1960 about 3,000 acres or about 0.03 percent of the basin had economic potential for irrigation. Appendix N, UMRCBS, projects the irrigation potential to include 68,000 acres or about 0.7 percent of the basin by the year 2000. Presently, some of the higher-valued crops are irrigated by ground water irrigation systems in the Upper Des Moines River and Raccoon River Basins.

RECREATION

61. There is a definite need for additional development of water-based recreation in the basin. The population is concentrated around the city of Des Moines and developments to serve this area should have first priority. Appendix K, UMRCBS, lists the following need priority:

* Expansion of surface water areas by construction of impoundments and maximum use of existing multiple-purpose reservoirs. Also, construction of single purpose recreational impoundments and additional access to existing natural water areas are needed.

* The capacity of this area to satisfy the water-based recreation need is largely dependent on solving the basin's water quality problems. Research in pollution control is a definite need.

* Land acquisition may be required because of the lack of publicly-owned land. Partial acquisition such as zoning, easements, and deed restrictions should be considered as part of the overall recreational program.

62. Recreational needs for water surface, land area, and in stream uses for 1964 through 2020 are shown in table C-4.

63. A 1967 report, "Recreation Resources in Central Iowa" by the Central Iowa Regional Planning Commission, gives an account of existing recreation in central Iowa and measures the immediate and long range needs for nine central Iowa counties surrounding Des Moines. The report includes the parameters of population, income, occupation, education, leisure time, mobility, and attendance at recreational areas. These parameters are then used to determine trends from which future needs are estimated. The 1967 goal for recreation land was exceeded by over 57,000 acres.

EROSION AND SEDIMENT

64. Gully erosion is the major erosion problem in the Des Moines River Basin. The gullies depreciate the value and utility of adjacent land. They cause damage to fences, roads, and buildings, and are hazards to farm operators and livestock. Appendix N, Agriculture, UMRCBS, states that, in 1966, gully erosion affected 2,530 acres and caused damage estimated at $956,000. By the year 2020 this damage is projected to increase to over $3 million annually. Projects presently considered feasible by the USDA, Soil Conservation Service, will prevent only $38,000 of this annual damage.

65. The sediment yield generally increases inversely with the size of the basin. The following estimates are given for areas of 10 square miles having different topographic characteristics. Above Des Moines the sediment yields are relatively low, representative yields being about 60 tons per square mile. An exception to this would be the bluff areas in the upper basin which would produce about 400 tons per square mile. The lower Des Moines River Basin produces relatively heavy sediment loads of about 1,100 tons per square mile. There are 13 suspended sediment measuring stations in the basin.

IMPROVEMENTS DESIRED

PUBLIC HEARINGS

66. At the initiation of this investigation, the District Engineer held five public hearings within the Des Moines Basin to obtain basic flood damage data from the local people. The hearings were attended by persons representing a wide cross section of interests in the basin, including the affected public and the general concerned public, Federal and State agencies, county and municipal governments, railroads, industry, and agriculture. In general, flood problems on the Des Moines River and tributary streams appeared to be of various magnitudes. Major damage areas were reported along the Des Moines River, East Fork Des Moines River, West Fork Des Moines River, Boone River, Raccoon River, Walnut Creek, and Lizard Creek.

67. A small stream with no name, was reported to have caused major flood damage in Van Meter, Iowa. According to the report, this stream and not Raccoon River, which flows adjacent to the town, caused the major flood problems. (Alleviation of floods on the unnamed creek was accomplished under authority of Section 205 of the 1948 Flood Control Act.)

68. Several people favored a reservoir on the Raccoon River above Jefferson, Iowa, pointing out that such a reservoir would provide flood control, water supply, and recreational benefits for the area.

69. Suggestions were made by some that flood control might best be solved by building a number of small detention reservoirs, rather than a few larger ones.

LATE-STAGE PUBLIC HEARINGS

70. Three public hearings were held on 23-24 June 1970 to describe six proposed improvements to the general public and to obtain views on each proposal. The meetings were attended by representatives of Federal, State, county, and municipal agencies, industry, commerce, transportation, and private individuals.

JEFFERSON RESERVOIR

71. Approximately 600 persons attended the hearing at Scranton, Iowa, on 23 June 1970, which was held primarily to consider the

Jefferson Reservoir. Generally, those favoring the reservoir were representatives of towns, chambers of commerce, civic and service organizations, and conservation groups, all in the immediate area of the reservoir. Most favorable arguments centered on the recreation, conservation, and water quality aspects of the proposal. Generally, opposition came from farmers whose homes and land would be taken. Other arguments in opposition concerned the probable lowered tax base because of land taken out of production, the rerouting of roads, the disruption of rural school districts, the adverse effects on tile drainage systems, and the relocation of cemeteries.

HEADWATERS, DES MOINES RIVER

72. The second public hearing was held at Humboldt, Iowa, on 24 June 1970, primarily to describe the investigations made in the upper reaches of the basin. The hearing was attended by about 75 persons. Corps personnel discussed the problem areas in the upper basin and explained why no improvements in those areas are being made at this time. A number of persons, representing mainly the agricultural community, expressed disappointment that no measures were proposed to relieve their flood problem. Others commented that they thought the investigation in their area was not sufficiently thorough or that all flood damage had not been taken into consideration.

DES MOINES METROPOLITAN AREA

73. The third public hearing was held at West Des Moines, Iowa, 24 June 1970, primarily to describe and receive comments on the

improvements proposed in the Des Moines metropolitan area. About 200 persons attended the hearing. The City Engineer of Des Moines, representing the city's Public Works Director, expressed support of all six projects considered for recommendation. The City Attorney of West Des Moines, representing the City Council, said that the proposals on Walnut Creek in West Des Moines were generally satisfactory; however, the City Council suggested several modifications and requested an opportunity to review detailed plans at a later date. Other expressions of opinion received at the hearing were as follows:

* Walnut Creek Reservoir. One speaker questioned the economic feasibility of the Walnut Creek Reservoir and suggested, in view of its low benefit-cost ratio, that alternatives be further studied. Another believed that soil conservation practices in the Walnut Creek Basin would solve the flood problem and restore the fish and wildlife values which, he felt, formerly existed in that area. Considerable discussion was devoted to the possible adverse effects of sedimentation in the reservoir, particularly on project life and on water quality in the downstream environmental corridor.

* Local Protection Along Walnut Creek and Fourmile Creek. Several speakers expressed concern that levees are proposed along only one side of these creeks and that flood heights on the opposite bank might increase as a result of the levee construction.

* Environmental Corridors, Des Moines River and Walnut Creek. The Director of the Polk County Conservation Board expressed interest in the environmental corridors, but wished to have additional time to study the proposals further. One home owner, representing his neighborhood on Walnut Creek, said that a rumored channel change would destroy an environmental corridor

consisting of a heavily wooded area already existing in his neighborhood, and that he and his neighbors would prefer that the natural environment be preserved.

74. Between 1970 and 1974 five of the six proposed improvements were eliminated from further consideration either by separate studies or by occurrence of events which made proposed measures infeasible. A public meeting was held in West Des Moines, Iowa, on 6 May 1975 to discuss the results of the study and specifically to discuss the proposed improvement for flood damage reduction at West Des Moines and Des Moines, Iowa. A draft of the Feasibility Report had been distributed throughout the river basin prior to the public meeting.

75. During the meeting formal statements indicating support of the proposed project were made by the cities of West Des Moines and Des Moines, the Iowa Natural Resources Council, the Iowa Conservation Commission, the West Des Moines Chamber of Commerce, and the Mid-Iowa Snowmobile Club, Inc. The Iowa Conservation Commission requested consideration be given to realigning the levee system along the Raccoon River to protect an existing gravel pit area which is to be developed for recreation. The Mid-Iowa Snowmobile Club requested consideration be given to providing multi-purpose trail systems as part of the project. Oral statements indicating general support of the proposed project were also made by six property owners.

76. One written statement was submitted and three oral statements were made requesting consideration be given to modifying the upstream tie-off along the right bank of Walnut Creek to provide protection for four businesses located there.

SECTION D

FORMULATING A PLAN

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SECTION D

FORMULATING A PLAN

1. This section of the report will discuss the plan formulation process. Working within the framework of adopted policies, alternative measures have been explored which would resolve the problems and fulfill the needs that have been defined in the study area. These alternatives have been screened to determine feasible solutions warranting further investigation. From this array of feasible solutions, an analysis has been made to identify a selected plan for recommendation. This section explains the planning process and demonstrates the plan formulation activity.

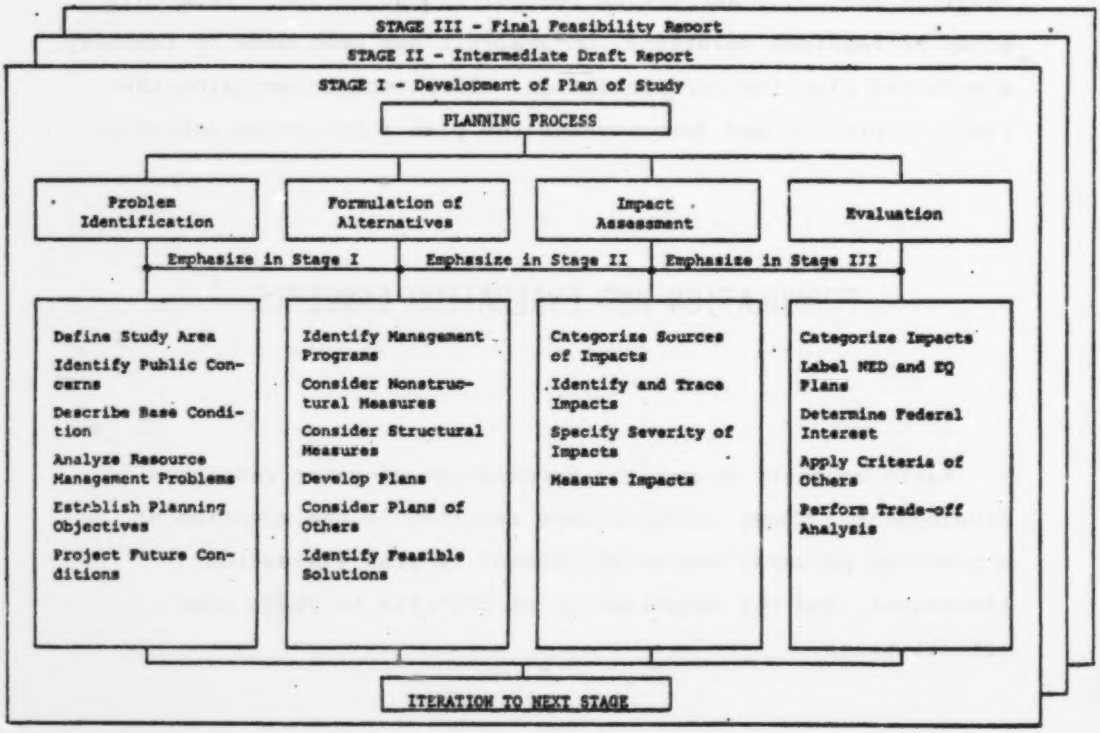
FORMULATION AND EVALUATION CONCEPTS

2. Basic concepts govern the formulation of water resources development. These concepts have resulted in the adoption of a planning process, the establishment of plan evaluation techniques, and the organization of criteria to judge plan effectiveness.

PLAN FORMULATION PROCESS

3. The repetitive process of plan formulation involves three stages of planning with each stage increasing in detail. Each stage is subdivided into four basic activities--problem identification, formulation of alternatives, impact assessment, and evaluation. The output of each stage is, respectively, the plan of study, intermediate feasibility reports, and the final report. As the process continues the level of detail increases, and the array of alternatives decreases to a selected plan. This process is presented in the following display.

PLAN FORMULATION PROCESS



STAGE III - Final Feasibility Report
STAGE II - Intermediate Draft Report
STAGE I - Development of Plan of Study
PLANNING PROCESS
Problem Identification
Formulation of Alternatives
Impact Assessment
Evaluation
Emphasize in Stage I
Emphasize in Stage II
Emphasize in Stage III
Define Study Area
Identify Public Concerns
Describe Base Condition
Analyze Resource Management Problems
Establish Planning Objectives
Project Future Conditions
Identify Management Programs
Consider Nonstructural Measures
Consider Structural Measures
Develop Plans
Consider Plans of Others
Identify Feasible Solutions
Categorize Sources of Impacts
Identify and Trace Impacts
Specify Severity of Impacts
Measure Impacts
Categorize Impacts
Label NED and EQ Plans
Determine Federal Interest
Apply Criteria of Others
Perform Trade-off Analysis
ITERATION TO NEXT STAGE

4. The goal in Stage I is to identify the scope and character of the study. The plan of study serves as a guide to subsequent planning. In Stage I the alternative plans are evaluated in terms of the planning objectives. In Stage II the alternatives are compared and evaluated. Stage III involves selecting the plan which best meets the dual objectives.

PRINCIPLES

5. The principles governing the plan formulation process are derived from several sources. The primary source is the Principles of Water Resource Development established by the Federal Water Resources Council. The established equal objectives for planning the use of water and related land resources of the United States are to:

* Enhance the National Economic Development by increasing the value of the Nation's output of goods and services and improving national economic efficiency.

* Enhance the Environmental Quality by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural or cultural resources and ecological systems.

6. Four accounts are used to measure a plan's efficiency in accomplishing the two objectives.

- Enhance national economic development.

- Enhancement of the environmental quality.

- Regional development and growth.

- Consideration of social well-being.

7. A second important source of principles is the library of laws established by Congress in numerous flood control acts and policy statements. These principles govern the Federal financial participation and define the national interest in both the studies themselves and the implementation of programs for water resource development.

STANDARDS

8. There are three sources for the standards that govern the evaluation of alternatives. The Corps of Engineers has published a series of directives that define proper procedure. Sound professional practice is a second source of standards. The Water Resources Council (WRC) has published standards to measure an alternatives effectiveness in satisfying the two planning objectives. The WRC standards require all beneficial and adverse effects of any proposal to be systematically identified, analyzed, and displayed.

CRITERIA

9. The evaluation criteria is a compendium of principles, standards, and informational criteria. Following these criteria enables the progression through the decision-making procedure of plan formulation. Criteria require that all technical information be developed and studies and analyses be performed within the guidelines of the standards. Technical criteria are established to enable decision making founded on reliable facts. Any recommended plan must be based on sound professional judgment. Technical, economic, environmental, and other related criteria must be met to assure maximum consideration of each alternative.

10. Technical Criteria can be both general or specific. General criteria apply to any Federal water resource project and specific criteria apply only to the specific area of study. Each proposed plan must be technically feasible to construct or implement. The selected plan must be practicable using existing technology. Each proposal must comply with regulations governing technical policy, design criteria, and technical assumptions requiring sound engineering judgment.

11. Economic Criteria which govern the evaluation of alternatives for water resources development include:

* Average annual tangible benefits must exceed annual charges, except for certain environmentally related instances.

- The scale of development must provide the maximum net benefits.

- Each separable unit of improvement should provide benefits at least equal to its cost.

- There should be no more economical means, evaluated on a comparable basis, of accomplishing the same purpose or purposes that would be precluded from development if the plan was undertaken.

12. Environmental Criteria that influences plan formulation and selection include:

- The formulation of plans must consider the preservation of enhancement of environmental resources as an equal objective with enhancement of the national economic development.

- Detrimental environmental effects must be avoided wherever possible and feasible mitigation features considered where such effects are unavoidable.

13. Other Criteria must also be considered to ensure a complete realization of project effects and to allow a comprehensive investigation of items that influence plan selection. Other criteria include:

- Plan formulation must be compatible with existing or proposed programs directed by State and local interests.

- Alternatives must be acceptable to the public.

- There can be no duplication of effort among the various Federal agencies having an interest in any plan of action.

- Federal interest in the plan must be determined.

PLANNING OBJECTIVES - DES MOINES RIVER BASIN

14. Specific planning objectives for the Des Moines River Basin were identified from an analysis of problems, needs, concerns, and opportunities within the basin area. These specific objectives not only reflect National Economic Development and Environmental Quality Objectives, but also objectives of local, State, and regional interests. The planning objectives used in formulation analysis are:

a. Achieve flood damage reduction for the flood-prone communities and rural areas of the basin.

b. Provide water and land related recreation opportunities.

c. Provide reservoir storage for municipal water supplies.

d. Improve stream water quality of the Des Moines River and tributaries.

e. Preserve open space areas along the Des Moines River and tributaries.

POSSIBLE SOLUTIONS

15. A reconnaissance of the Des Moines River and its tributaries was the first step toward possible solution of the flood problems. Water related needs in the basin, other than flood control, were considered only in connection with studies for flood damage reduction. Potential damsites, channel conditions, and areas where concentrated damage occurred were inspected. The District Engineer participated in the reconnaissance and on a number of occasions consulted with local interests on their flood problems. Studies made at various locations where the need was indicated are briefly described in the following paragraphs.

DES MOINES RIVER BASIN - STRUCTURAL

16. The structural plan for the Des Moines River Basin consisted of two general areas of investigations--reservoirs and local flood protection programs.

RESERVOIRS

17. Several reservoir sites were investigated on the main stem above Saylorville Lake and on tributary streams downstream from Red Rock Dam.

18. Fort Dodge, Iowa, was considered as a reservoir site. The preliminary study investigated constructing a reservoir on the Des Moines River immediately upstream from the hydroelectric power dam at Fort Dodge, Iowa. A multipurpose reservoir at this site would reduce flood damage at Fort Dodge and Lehigh and in rural areas, improve water quality, and provide recreational benefits. Physical characteristics at the site appeared favorable, but the study was discontinued because insufficient flood control benefits and an inordinately high cost of relocations.

19. Lizard Creek Reservoir was studied. This creek enters the Des Moines River on the right bank at Fort Dodge. It has a total drainage area of about 440 square miles and is divided into two branches. A small reservoir was considered for each branch, but studies were discontinued when economic justification for flood control was found to be lacking.

20. West Fork Des Moines River was investigated for a possible reservoir. On this branch of the Des Moines River, a potential damsite was studied about four miles upstream from Jackson, Minnesota. The study was discontinued because of low available storage, high project cost, the proximity of the town of Windom at the upstream end of the reservoir, and the narrowness of the valley and low relief.

21. Boone River was also considered for a reservoir. A study was made of the Tunnel Mill Dam, located about 10.9 miles upstream from the Des Moines River. This site was the subject of an unpublished report dated July 1958. At that time a capacity equivalent to only about one-third of an inch of runoff was available for flood control and an extremely low benefit-cost ratio was derived. No further studies of this site were conducted.

22. Whitebreast Creek was investigated as a potential reservoir site. This tributary has a drainage area of 430 square miles and enters Lake Red Rock just upstream from the dam. A preliminary study was made for a flood control dam about 9 miles southeast of Osceola, Iowa. With all benefits considered, the benefit-cost ratio was found to be only about 0.5. A program for this watershed under authroity of Public Law 566 is underway, having been approved by the State committee.

23. Beaver Creek was studied in a cooperative effort of the Soil Conservation Service, US Department of Agriculture, and the US Army Corps of Engineers. A detention reservoir on Beaver Creek, about 40 miles above its mouth, reservoirs on some tributaries, and various channel improvement practices were considered. Efforts to organize the watershed under Public Law 566 were not successful.

24. Walnut Creek enters the Raccoon River through the left bank in Des Moines, just downstream from West Des Moines. A reservoir

on Walnut Creek and a local protection project along the downstream reaches of the creek were proposed. Local protection projects were considered also for the towns of Clive and Windsor Heights, and for the left bank area of Des Moines adjacent to Grand Avenue. These were found not to be economically justified. The proposed Walnut Creek Reservoir would reduce flood damage in all three locations, in addition to benefiting agricultural land between the damsite and Clive.

25. Two sites were considered for the Walnut Creek Reservoir. The first was farther downstream from the one adopted. Although it offered better flood control by having a larger drainage area, it would have involved railroad and highway relocations and excessive rights-of-way cost since part of the reservoir area was highly urbanized. These excessive costs prompted the adoption of site 16 shown on plate D-1.

26. Raccoon River, a major tributary of the Des Moines River, joins that stream through the right bank at the city of Des Moines. Three reservoir sites, two on the Raccoon main stream at Commerce and at Adel, and one on the South Raccoon, at Van Meter, Iowa, were studied. A review of these studies revealed that their development for any combination of purposes was economically infeasible. Three additional sites studied for this report were considered for multipurpose use. One site is on the Middle Raccoon at mile 251 and one on the South Raccoon at mile 255. Construction at either of these sites would produce insufficient benefits to justify development. The third site, located on the main Raccoon River about 10 miles upstream from Jefferson, Iowa, and designated as Jefferson Reservoir would control

about 1,552 square miles of drainage area and would be built for the multiple purposes of flood control, recreation, fish and wildlife, and water quality control. The Federal Water Quality Administration had determined that the water quality need in the year 2020 at Des Moines could be supplied by storage of 148,000 acre-feet at this site.

27. North, Middle, and South Rivers discharge into Lake Red Rock. Dams for flood control were contemplated on each of the streams. Since the flood problems on North River were more serious than those on the South and Middle Rivers, pilot studies were initiated on that stream. Three damsites were considered for study. One site located about 4 miles southwest of Norwalk, Iowa, would control a drainage area of 330 square miles. The estimated cost of a flood control project at that site was found to be not economically justifiable. The other two sites were located on branches of North River, one 6 miles northeast and one 6 miles northwest of Winterset, Iowa. Further study was discontinued for lack of sufficient flood control benefits.

28. The reservoir site 6 miles northwest of Winterset, Iowa, was reevaluated following identification of a water supply need for Winterset. Reservoir construction costs were compared to benefits for both flood control and water supply. The total benefits were not sufficient to justify further study.

LOCAL FLOOD PROTECTION PROJECTS

29. An investigation of flood problems in flood prone communities was initiated to identify the feasibility of providing flood control.

30. Fort Dodge was considered for a local protection project. The plan which consisted of levee and floodwall was to extend along the left bank of the Des Moines River from the Illinois Central Railroad Bridge downstream to Kenyon Avenue. The plan was not economically justified.

31. Lehigh Local Protection consisting of levees and a floodwall was considered for the areas in the vicinity of the highway bridge on both banks of the Des Moines River. Neither unit was economically justified.

32. Boone River was investigated for flooding at Webster City. A detailed project report for flood control is being prepared. The preliminary recommendation is the continuation of present flood plain management measures adopted by the city.

33. West Fork Des Moines River, Rural Local Protection was considered as a pilot study for flood protection. The study covered a 14 mile rural reach extending from south of Rodman to Emmetsburg, in Palo Alto County, Iowa. Channel and levees were designed for a flood having a recurrence interval of once in about 10 years. The plan did not show economic justification. Since this reach was considered to have the highest potential for rural local protection in the upper basin and no justification was found, further study was discontinued.

34. West Fork Des Moines River, Urban Local Protection, was investigated. Flood problems at Jackson and Windom, Minnesota, and at Estherville, Iowa, have been considered under authority of Section 205 of the 1948 Flood Control Act. At Jackson, further study was discontinued because of local financing problems. The other two investigations were discontinued because they lacked economic justification.

35. East Fork Des Moines River, which extends from near Humboldt, Iowa, to its headwaters in Martin County, Minnesota, has a narrow flood plain. Damage resulting from direct invasion of floods is not adequate to justify flood protection works at this time.

36. Raccoon River flooding was investigated and local protection was considered for the communities of Adel, Guthrie Center, and Van Meter, Iowa. Both Guthrie Center and Van Meter were studied under authority of Section 205 of the 1948 Flood Control Act, as amended. The project at Guthrie Center was not recommended because local interests were unable to comply with cooperation requirements. Construction of the project at Van Meter was completed in 1964. A local protection project for Adel was not economically justifiable.

37. Fourmile Creek is a stream with a drainage area of 121 square miles, which enters the Des Moines River through the left bank and empties into the upper reaches of the Red Rock Reservoir. Flood

problems have been experienced at various locations between the mouth of the creek and Aurora Avenue in Des Moines, Iowa.

38. A detailed project report for flood control is being prepared and is scheduled for completion in July 1975.

DES MOINES RIVER BASIN - NONSTRUCTURAL

39. Several nonstructural alternatives were investigated in the planning process.

ENVIRONMENTAL CORRIDORS

40. Walnut Creek Environmental Corridor was investigated. Areas downstream from the Walnut Creek Reservoir would be adaptable to environmental development as a result of controlled reservoir releases which would reduce flooding. This additional land would furnish wildlife habitat that would replace habitat lost as a result of the reservoir development. The corridor would extend along Walnut Creek for about seven miles from the damsite to N.W. 86th Street in Clive, Iowa. Flood control benefits would not accrue from the purchase of land through the town of Clive, because lands that would be acquired for the corridor have been reserved by that community for open space preservation. Flood plain lands from the west limits of Clive to the damsite are largely undeveloped. Buying this land for the corridor would result in minimal flood control benefits. The provision of recreational

facilities would be included with corresponding benefits accruing to the project.

41. Des Moines River Environmental Corridor was also considered. The Saylorville Lake was authorized by the Flood Control Act of 1958 (Senate Document No. 98, 85th Congress), and construction was started in June of 1965. Since authorization, operational problems have been recognized, such as crop damage that would occur in the reach upstream from Des Moines, on the average every 4 or 5 years from releases exceeding the channel capacity. Channel improvements and/or land acquisition would permit the flexibility of operation needed to reduce these problems. Areas downstream from the reservoir would also be adaptable to environmental corridor development as a result of controlled reservoir releases. The corridor would extend along the Des Moines River for 8 miles from the damsite to the north limits of Des Moines. Part of the area near the river is being farmed. Acquiring lands for the corridor would decrease agricultural damage by discontinuing their use as croplands. Those lands would be used to preserve and enhance the environment by serving as wildlife habitat and for recreation.

NONSTRUCTURAL PLANS

42. For the numerous localities where flood damage occurs but is not sufficiently concentrated to warrant flood protection improvements, other measures to alleviate or to eliminate the flood problem are sometimes available. These include provision of designated floodways, subdivision regulation, building codes, zoning, flood warning systems, evacuation, and flood-proofing of existing and

future structures. A complete nonstructural plan encompassing the entire basin was not identified. Nonstructural plans considered for flood damage reduction are presented below.

43. Flood Forecasting and Warning System were considered. The Des Moines River Basin has a flood forecasting and flood warning system provided by the US Weather Bureau. This system was quite effective in reducing the danger to life and losses of property from the spring thaw floods of 1965 and 1969. These accurate and timely flood forecasts and warnings are expected to continue to provide public awareness of the hazard to life and to provide time for emergency protection of valuable property or the relocation of moveable goods. However, the flood forecasting and warning system is not very effective in preventing flood damage in the upper portion of the basin or on tributaries from floods caused by heavy rainfall.

44. Flood Plain Evacuation is of two types; immediate evacuation and evacuation over a period of time. In highly developed areas, immediate evacuation is usually done in conjunction with urban renewal. The city of Fort Dodge as part of its urban renewal plan is in the process of evacuating the Des Moines River flood plain on the left bank from 3rd Street downstream to Kenyon Road. In sparsely developed areas immediate evacuation can often be accomplished in conjunction with open space recreation or other logical flood plain uses. Flood plain evacuation studies indicate that, in most instances, the most economical plan would be one that is gradually executed over a period of time in conjunction with good flood plain management.

45. Flood proofing is a combination of structural changes and adjustments to properties subject to flooding primarily for reduction or elimination of flood damage. Although it is more simply and economically applied to new construction, flood proofing is also applicable to existing facilities. It has promise in certain situations:

* Where moderate flooding with low stage, low velocity and short duration is expected.

* Where the traditional type of flood protection is not feasible.

* Where individuals desire to solve their flood problems without collective action, or where collective action is not possible.

* Where activities depend on riverbank locations but need some degree of protection.

* Where a resource manager desires a higher degree of protection than that which is provided by a flood control project.

46. Flood Proofing Measures have been utilized. The following items are the ones most commonly considered.

Seepage control
Sewer adjustment
Permanent closure
Openings protected
Interiors protected
Protective coverings
Fire protection
Appliance protection
Utility adjustments
Roadbed protection
Elevation or raising
Temporary removal
Rescheduling
Proper salvage
Watertight casing
Proper anchorage
Underpinning
Timber treatment
Deliberate flooding
Structural design
Reorganized use

47. Flood Plain Management provides guidelines for flood plain development to lessen the damaging effects of floods. Flood plain management does not reduce or eliminate the flood hazard. Flood plain regulations imply the adoption and use of legal tools with which to control the extent and type of future development which will be permitted in the flood plain. For these controls to be effective, it is necessary that the public understand the general flood problem, the degree of risk, and the methods that can be used to control use of the land. The following are means of effecting flood plain management.

* Designated Floodways and Encroachment Lines. A designated floodway is the area of channel and those portions of the flood plain adjoining the channel which are required to carry the flood flows. The encroachment lines are the lateral boundaries of the floodway, one on each side of the river. Land filling or construction should not be permitted in the floodway.

* Zoning is the legal tool that is used to implement and enforce the detailed plans resulting from the planning program. It is used by towns, cities, counties, and agencies of the state to control and direct the use and development of land and property within their jurisdiction. Zoning insures the safekeeping of property for the public health and welfare and the best use of available land. Designated floodways may be zoned to pass floodwaters and for other limited uses that do not conflict with this primary purpose. The ordinance may also establish regulations for the flood plain areas outside the floodway. These include designating the lowest elevation that certain types of development can be constructed. Flood plain management services are available to local interests upon request.

* Subdivision Regulations provide an efficient means of controlling construction in presently undeveloped flood plain areas. Typical provisions that would be helpful in preventing future flood damage include:

(a) Show the extent of the flood plain on the subdivision maps.

(b) Show the floodway limits or encroachment lines.

(c) Prohibit fill in the channel and floodway that would restrict flood flows.

(d) Require that all roads within the subdivision be above the elevation of a selected flood level.

(e) Require that each lot contain a building site with an elevation above a selected flood level.

(f) Having defined the flood hazard areas, local governmental agencies may deny the extention of sewer and waterlines into flood plain areas as being detrimental to the public health and welfare of the community.

48. Flood Plain Information Studies are available for localities requesting this service. For the Des Moines River Basin, reports of three such studies are completed. These reports are:

(1) Des Moines River between Saylorville Lake and the Center Street dam in Des Moines, Iowa;

(2) The North Raccoon River at Sac City, Iowa; and

(3) West Fork Des Moines River at Windom, Minnesota.

49. The program involves compiling and disseminating information on flood hazards. It makes technical advice and guidance available on flood plain use and damage reduction. Information, including flood frequencies and profiles for an individual site, can be provided to the local governmental agency requesting this service.

ALTERNATIVES CONSIDERED FURTHER

50. Several alternatives merited additional investigation and analysis. Plans of improvement were considered for two reservoirs, for two local flood protection projects, and two environmental corridors.

* Jefferson Reservoir

* Walnut Creek Reservoir

* West Des Moines and Des Moines, Iowa, at Walnut Creek - local protection

* Des Moines, Iowa, on Fourmile Creek - local protection

* Walnut Creek environmental corridor

* Des Moines River environmental corridor

JEFFERSON RESERVOIR

51. The damsite considered is located in Greene County, Iowa, on the Raccoon River about 100 miles above its mouth, about 10 river miles upstream from Jefferson, Iowa. The drainage area above the damsite is 1,552 square miles. The reservoir is about 24 miles in length, covering about 35 river miles in Greene, Carroll, and Calhoun Counties. The valley in the reservoir area is rather narrow, the flood plain having a maximum width of about a half mile. The area that would be covered at elevation 1090 is approximately 10,700 acres. The area required for the project would be about 15,200 acres. In general, the bottom lands are largely cultivated, and the valley slopes, mostly gentle but sometimes steep, are open and wooded pasture. At elevation 1090, the reservoir would have a capacity of 312,000 acre-feet. Two primary State roads, several secondary roads, and two railroads cross the reservoir area. The elevation 1090 for spillway crest plus the surcharge for the spillway design flood represents essentially the maximum that this site would afford. Pertinent data on the proposed dam and reservoir follow:

ENGINEERING DATA

- Dam

Location: Raccoon River, Green County, about 100 miles above mouth.

Composition: Earth embankment, outlet conduit at base, concrete spillway in right bluff.

Embankment: Height, 106 feet; length at crest 2,600 feet; riprap on upstream slope, grass and riprap downstream.

Spillway: Concrete; Ogee weir, chute, and stilling basin, all 425 feet wide. Weir crest elevation 1090.

Outlet: Concrete conduit, 5.5 by 7 feet; three control gates; flared stilling basin.

* Reservoir

Sediment pool: Capacity, 33,300 acre-feet, for 100-year accumulation, surface elevation 1046, 2,400 acres.

Water quality control pool: Capacity, 148,000 acre-feet between elevation 1046 and 1075, area, 7,900 acres.

Flood control pool: Capacity, 130,700 acre-feet between elevations 1075 and 1090, area, 10,700 acres.

* Runoff data

Drainage area: 1,552 square miles

Spillway design capacity: 192,000 c.f.s.

Standard project flood: Inflow, 99,000 c.f.s.

Capacity, flood control: 1.58 inches of runoff

ENVIRONMENTAL DATA

Aesthetic value: High relative value, meandering with numerous coves and embayments. An enhancement program planned.

Recreation: Full recreational development planned. Sponsoring agency was Iowa State Conservation Commission. Development accomplished in two phases.

Fish and wildlife: Opportunity for high quality sport fishery.

ECONOMIC DATA (1970 VALUES)

Average Annual Benefits	$2,225,600
Average Annual Costs	1,662,600
Benefit-to-Cost Ratio	1.34

WALNUT CREEK RESERVOIR

52. The site of the proposed Walnut Creek Reservoir is in Dallas County, Iowa, on Walnut Creek, a tributary of the Raccoon River. The damsite is about 0.1 mile upstream from the Polk-Dallas County line and about 6 miles upstream from West Des Moines. The project is proposed for multiple-purpose development to include flood control, fish and wildlife conservation, and recreation. The proposed reservoir would provide 25,500 acre-feet of flood control

storage which is equivalent to 10 inches of runoff from the 49 square-mile contributing watershed. At the top of the flood control pool, elevation 940, the surface area would be 1,450 acres. The conservation pool at elevation 912 would have a capacity of 6,000 acre-feet and a surface area of 420 acres. Pertinent data on the dam and reservoir follow:

ENGINEERING DATA

*Dam

Location: Walnut Creek, about 13 miles above its confluence with Raccoon River, about 6 miles upstream from West Des Moines, in Dallas County, Iowa.

Composition: Earth embankment, outlet conduit at base, concrete spillway in left bluff.

Embankment: Height, 80 feet; length at crest 4,550 feet; upstream slope riprapped, downstream seeded.

Spillway: Ogee weir, chute, and stilling basin, all 50 feet wide. Weir crest elevation 940.

Outlet: Concrete box, 6 by 6 feet, flared stilling basin, uncontrolled, except inlet riser at elevation 912.

* **Reservoir**

Sediment pool: Capacity, 4,500 acre-feet for 100-year accumulation, surface elevation 907.

Conservation pool: Capacity, 6,000 acre-feet, surface elevation 912, 420 acres.

Flood control pool: Capacity, 25,500 acre-feet, surface elevation 940, 1,450 acres.

* **Runoff data**

Drainage area: 49 square miles

Spillway design capacity: 12,840 c.f.s.

Standard project flood: Inflow, 19,500 c.f.s.

Capacity, flood control: 10 inches of runoff

ENVIRONMENTAL DATA

Aesthetic value: Low quality. Extensive landscaping program proposed.

Recreation: Full project recreational development. Development accomplished in two phases.

Fish and wildlife: Opportunity for considerable sport fishery. Loss of wildlife habitat. Mitigation program proposed.

ECONOMIC DATA (1970 VALUES)

Average Annual Benefits	$457,000
Average Annual Costs	440,600
Benefit-to-Cost Ratio	1.04

FLOOD DAMAGE REDUCTION AT WEST DES MOINES AND DES MOINES, IOWA, ALONG THE RACCOON RIVER, WALNUT CREEK, AND JORDAN CREEK

53. The plan as formulated in 1970 is described below. This plan was based on implementation of the proposed Jefferson and Walnut Creek reservoirs.

ENGINEERING INFORMATION

54. The plan of improvement for West Des Moines and a small area of Des Moines would provide protection against coincidental flooding on the Raccoon River, Walnut Creek, and Jordan Creek having a recurrence interval of once in about 200 years. The design flows reflect the modification of natural flows on these streams that would be affected by the Jefferson and Walnut Creek Reservoirs.

55. The plan of improvement includes new and improved levees along the left bank of Jordan Creek, the left bank of the Raccoon River, and along the right bank of Walnut Creek, road ramps, railroad track raises, closure structures, and a pumping station. Nominal freeboard will be three feet, increased to four feet in the upstream reaches along both streams.

ENVIRONMENTAL DATA

56. Consideration was given to preserving and enhancing the appearance of the Raccoon River waterfront and the affected area along the right bank of Walnut Creek. Landscaping plans were considered, but none were developed in this stage of planning.

57. There are certain areas along both the Raccoon River and Walnut Creek that provide access for fishing and other water-related activities. To mitigate any adverse environmental effects of construction of the proposed flood control structures, the plan provides for ramps and foot paths over and along the levee crown. Other features include general landscaping and seeding of areas disturbed by construction.

ECONOMIC DATA (1970 VALUES)

Average Annual Benefits	$207,500
Average Annual Costs	138,500
Benefit-to-Cost Ratio	1.50

FLOOD DAMAGE REDUCTION AT DES MOINES, IOWA, ALONG FOURMILE CREEK

58. A description of the project as formulated in 1970 is presented.

ENGINEERING DATA

59. The flood damage reduction plan consisted of earthen levees along both banks of Fourmile Creek providing flood protection for about 375 residential and commercial properties. The left bank protection extended from Williams Street to Douglas Avenue. The right bank protection extended from Williams Street to Easton Boulevard.

ENVIRONMENTAL DATA

60. Studies were made to determine the environmental needs of the affected area. Consideration was given to preserving and enhancing the appearance of the general project area. From the studies made, a landscaping plan was developed to complement future plans by the city for the Fourmile Creek flood plain.

ECONOMIC DATA (1970 VALUES)

Average Annual Benefits	$77,600
Average Annual Costs	73,400
Benefit-to-Cost Ratio	1.06

DES MOINES RIVER ENVIRONMENTAL CORRIDOR

61. This plan as formulated in 1970 would provide additional flexibility in the operation of the Saylorville Lake Project on the Des Moines River. Measures would be implemented to eliminate damages caused by reservoir discharges which exceed the channel capacity. The reach of flood plain involved in the project as formulated in 1970 extended from the Saylorville Dam to the city limits of Des Moines, about 7 river miles or about 4.5 valley miles. Control of corridor lands in this reach would permit a reservoir regulation plan to be implemented without consequential damage. The project objectives were:

*** Provide flexibility of operation for the Saylorville Lake.**

*** Preserve the natural features of undeveloped areas in the reach.**

*** Prevent encroachment of the nature areas.**

*** Discontinue cultivation of bottom land areas in the reach with subsequent prevention of crop damage.**

*** Provide special recreational facilities and opportunities.**

62. The average annual benefits for the project are $212,800 and the average annual costs are $226,045, resulting in a benefit-to-cost ratio of 0.94. These figures are based on 1970 values.

WALNUT CREEK ENVIRONMENTAL CORRIDOR

63. This project would mitigate the loss of wildlife habitat that would occur from development of the Walnut Creek Reservoir. It involves purchase of land along Walnut Creek between the Walnut Creek damsite and the city of Clive. The area is considered to be ideally suited for development into a "green belt" connecting downstream communities with the recreation facilities of the reservoir. The project would have the following objectives:

* Mitigate the loss of 350 acres of wildlife habitat from reservoir development.

* Preserve the natural features of the undeveloped flood plain.

* Prevent encroachment into the nature areas.

* Develop special recreational facilities.

64. The average annual benefits of this project are $91,000 and the average annual costs are $51,700. These are 1970 values and result in a benefit-to-cost ratio of 1.8.

SELECTING A PLAN

65. One plan was selected to be recommended as other alternatives were eliminated from consideration by decisions which are described below.

FLOOD DAMAGE REDUCTION AT DES MOINES, IOWA, ALONG FOURMILE CREEK

66. In March 1972, the City of Des Moines requested a detailed study under Section 205 of the 1948 Flood Control Act, as amended. In response to this request, a reconnaissance report was prepared indicating initial justification of the project formulated in 1970 and recommending continued study. Presently, a Detailed Project Report is being prepared. These events have excluded the Fourmile Creek study from the scope of this report.

DES MOINES RIVER ENVIRONMENTAL CORRIDOR

67. In July 1972, the Iowa Conservation Commission agreed to participate in cost-sharing for recreational development of the Des Moines River environmental corridor subject to three conditions; (1) the project be extended downstream, approximately one mile to Sixth Avenue within the city of Des Moines, Iowa; (2) involvement

of the city of Des Moines as set forth by resolution of the Des Moines City Council; and (3) availability of participating funding.

68. The Des Moines River environmental corridor is currently proposed as a modification to the Saylorville Lake Project. This corridor study is being coordinated with the State of Iowa, Polk County, and the city of Des Moines.

WALNUT CREEK AND JEFFERSON RESERVOIRS

69. During 1971, local cooperating sponsors for recreation indicated lack of financial and/or interest in recreation cost-sharing on these proposed reservoirs. The Environmental Protection Agency indicated that water quality storage for Jefferson Reservoir is unnecessary. Both reservoirs required benefits from recreation. Jefferson also required benefits from water quality in order to justify economically. Due to these developments, the two reservoirs are not feasible projects.

WALNUT CREEK ENVIRONMENTAL CORRIDOR

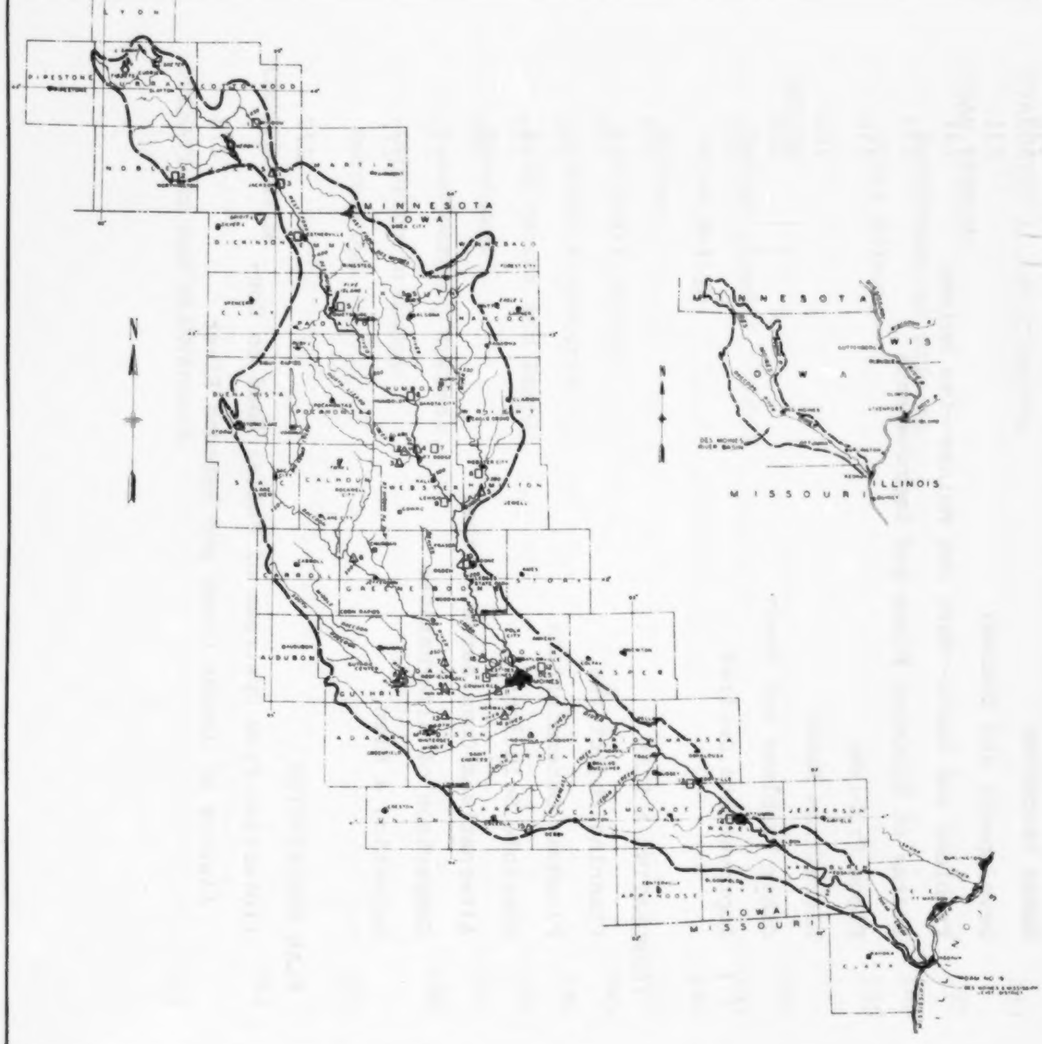
70. The lack of a local sponsor for this project and the lack of interest in the reservoir resulted in the elimination of this project as a feasible alternative.

FLOOD DAMAGE REDUCTION AT WEST DES MOINES AND DES MOINES, IOWA, ALONG THE RACCOON RIVER, WALNUT CREEK, AND JORDAN CREEK

71. This local flood protection proposal is selected to be recommended. The system of flood protection as presently formulated has been modified to reflect the infeasibility of the Jefferson and Walnut Creek reservoirs and to reflect current needs of the communities. A discussion of this project is presented in the next section.

CORPS OF ENGINEERS

U.S. ARMY


MINNESOTA
IOWA
MISSOURI
ILLINOIS
WIS
LYON
PIPESTONE
MURRAY
COTTONWOOD
NOBLES
JACKSON
MARTIN
DICKINSON
CLAY
PALO ALTO
KOSSUTH
HANCOCK
BUENA VISTA
POCAHONTAS
HUMBOLDT
CALHOUN
WEBSTER
HAMILTON
CARROLL
GREENE
BOONE
STORY
AUDUBON
GUTHRIE
DALLAS
POLK
JASPER
ADAIR
MADISON
WARREN
MARION
MAHASKA
UNION
CLARKE
LUCAS
MONROE
WAPELLO
JEFFERSON
APPANOOSE
DAVIS
VAN BUREN
LEE
DES MOINES RIVER BASIN
N

LEGEND

□ URBAN FLOOD PROBLEMS
1 WINDOM, MINNESOTA
2 WORTHINGTON, MINNESOTA
3 JACKSON, MINNESOTA
4 ESTHERVILLE, IOWA
5 EMMETSBURG, IOWA
6 HUMBOLT, IOWA
7 FT DODGE, IOWA
8 WEBSTER CITY, IOWA
9 LEHIGH, IOWA
10 BOONE, IOWA
11 WEST DES MOINES, IOWA
12 DES MOINES, IOWA
13 EDDYVILLE, IOWA
14 OTTUMWA, IOWA

— RURAL FLOOD PROBLEMS
1 WEST FORK DES MOINES RIVER, PALO ALTO CY, IOWA

△ POTENTIAL RESERVOIR SITES
1 JACKSON
2 NORTH LIZARD CREEK
3 SOUTH LIZARD CREEK
4 FORT DODGE
5 TUNNEL MILL
6 JEFFERSON
7 ADEL
8 MIDDLE RACCOON
9 VAN METER
10 SOUTH RACCOON
11 COMMERCE
12 NORTH RIVER, SITE C
13 NORTH RIVER, SITE B
14 NORTH RIVER, SITE A
15 WHITEBREAST CREEK
16 WALNUT CREEK

○ ENVIRONMENTAL CORRIDORS
1 DES MOINES RIVER FROM SAYLORVILLE DAM DOWNSTREAM TO DES MOINES LOCAL PROTECTION PROJECT
2 WALNUT CREEK FROM DALLAS COUNTY LINE DOWNSTREAM

DES MOINES BASIN
IOWA & MINNESOTA
GENERAL MAP

CORPS OF ENGINEERS U S ARMY
ROCK ISLAND ILLINOIS

ROCK ISLAND DISTRICT

PLATE D-1

SECTION E

THE SELECTED PLAN

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SECTION E

THE SELECTED PLAN

1. The local protection project for West Des Moines is the plan selected for recommendation.

2. Since this study and report dealt with the Des Moines River Basin and has not presented detailed information for the West Des Moines--Des Moines Study area specifically, this section first outlines the resources and economy, the problems and needs, planning objectives, and the possible solutions considered in the plan formulation process for West Des Moines--Des Moines study area. The report then describes the selected plan in detail citing its accomplishments, its adverse and beneficial effects, and its design features.

3. The study area is the urban flood plain area along 4 miles of the Raccoon River, along 3 miles of Walnut Creek, and along 0.7 mile of Jordan Creek. Part of the study area is within the city limits of Des Moines, part within the city of West Des Moines, and part within Polk County as shown on plates E-17 and E-19. The majority of flood damage occurs along the left bank of the

Raccoon River, the right bank of Walnut Creek, and the left bank of Jordan Creek. Urban flood damage problems along Walnut Creek upstream of the West Des Moines--Des Moines area was addressed in the initial screening process of the Des Moines basin study and was discussed earlier in this report.

RESOURCES AND ECONOMY OF WEST DES MOINES--DES MOINES

ENVIRONMENTAL SETTING AND NATURAL RESOURCES

4. This section presents a description of the natural setting and resources.

GEOLOGY AND LAND USE

5. Physiographically, the study area is located within the drift covered plains of the Central Lowland Province. The area is characterized by extensive glacial deposits with the most recent advance occurring during the Cary substage of the Wisconsin glacier, approximately 13,000 b.p. The area was subsequently mantled in varying thicknesses with loessial drift material. This region of Iowa is generally referred to as the Des Moines glacial drift lobe.

6. The Raccoon River valley at the confluence with Walnut Creek is well developed, having a flood plain approximately one mile wide. Walnut Creek, flowing from the north, is a major tributary of the Raccoon River. However, it has a relatively small flood plain with only a moderately developed bluff line and is probably more recent in origin than the surrounding drainage system. In general, the topographic setting of the project area consists of a moderately broad, level flood plain, with older terraces occurring 15-40 feet above more recently formed secondary terraces. These older terraces form step-like benches, which are slightly undulating in relief due to the affects of recent erosion.

7. The alluvial flood plain on which the proposed project will be located was formed by late Pleistocene and recent outwash material. The bluffs on the upper extremity of Walnut Creek are relatively unpronounced with slight slopes. Near the confluence with the Raccoon River, the bluffs north of Walnut Creek become moderately steep in slope, rising 100-150 feet above the adjacent flood plain.

8. Plates E-17 and F-1 show the general location and the flood plain land use of the project area. The largest concentration of urbanized development in the study area is in West Des Moines and a small segment of Des Moines located southwest of Walnut Creek. This area includes about 660 acres of highly urbanized environment, about 200 acres of agricultural development, and approximately 70 acres of woodland. This area encompasses 922 of the 925 homes, 143 of the 150 commercial establishments, and 22 of the 25 industries lying in the flood plain of the project area. Seven commercial establishments and three homes are located east of Walnut Creek in a small section of the flood plain of Des Moines at Grand Avenue. Three industries are located in the flood plain southwest of Jordan Creek.

TRANSPORTATION FACILITIES

9. Ground transportation in the urban area is dependent upon city buses, taxicabs, and privately-owned motor vehicles. A good system of city streets and highways together with the interstate system (I-80--I-35, and I-235) provides the basis for reliable movement through the metropolitan area.

10. The study area is bisected north-south by 63rd Street, a major urban artery which also serves as the boundary between Des Moines and West Des Moines. Immediately north of the project area the Des Moines Freeway No. 235 crosses Walnut Creek before continuing eastward, thence north to tie with the east-west Interstate 80 and the north-south Interstate 35. Braniff, Ozark, and United Airlines provide service to the Des Moines Municipal Airport located about 2.5 miles southeast of the project area. Greyhound buslines also provide passenger service into the Des Moines--West Des Moines area. The Chicago, Milwaukee, St. Paul, and Pacific Railroad provides freight service, including trackage closely paralleling Walnut Creek. In addition, the Chicago, Rock Island and Pacific together with the Chicago and Northwestern Railroad service the southern portion of the project area, with extensive trackage along Railroad Avenue.

CLIMATE

11. The Des Moines, Iowa, area experiences marked seasonal contrasts in both temperature and precipitation which are characteristic of continental climates. In the winter months cold, dry air predominates and the summer months warm, moist air is preponderant. The average temperature for the year is 50 degrees F.,

however, extremes of -21 degrees F. in midwinter to 105 degrees F. in midsummer have been recorded at the Des Moines Airport. Precipitation averages about 31.0 inches annually, but the variation is large, from a minimum of 17.1 inches to a maximum of 56.8 inches. Monthly variations range from a minimum of 0.03 inch to a maximum of 15.79 inches. The average seasonal snowfall is 32 inches. The average growing season is 171 frost-free days from about 21 April to 3 October. Table E-1 summarizes the climatological data for Des Moines, Iowa.

Table E-1

CLIMATOLOGICAL DATA - DES MOINES, IOWA 1/

Month	Average Monthly Precipitation Inches 2/	Mean Monthly Temperature Degrees F. 2/	Mean Monthly Snowfall Inches 2/
Jan	1.13	20.7	8.5
Feb	1.13	24.7	6.7
Mar	1.92	36.3	7.2
Apr	2.82	50.4	1.5
May	4.26	61.4	Trace
Jun	4.65	71.1	0
Jul	3.42	76.0	0
Aug	3.53	73.7	0
Sep	3.45	65.4	0
Oct	2.38	54.2	0.1
Nov	1.58	38.4	2.4
Dec	1.19	26.1	6.2
Yearly Annual	31.46	49.9	32.6

1/ National Weather Service Office, Municipal Airport.
2/ 34 years of record.

AIR QUALITY

12. The National primary ambient air quality standards for particulate matter are 75 micrograms/M3 as an annual geometric mean and 260 as a maxiumum 24-hour concentration not to be exceeded more than once per year. The Des Moines observed (at 5299 N.E. 15th Street) annual geometric mean was 82, slightly above the standard; and the maximum recorded was 255, slightly below the standard.

GROUND WATER

13. The Raccoon River valley supplies water for one of the largest water infiltration galleries in the world. Until 1950 it supplied the public water supply needs of the Des Moines area. The sands and gravel deposited in the Raccoon River valley are saturated with ground water, about 90 percent of which infiltrates from the Raccoon River, with the balance coming from rain or snow. Underlying this aquifer is an impervious layer of blue clay. The city water collection gallery is some three miles in length, four feet in diameter, and is parallel to the Raccoon River, about 150 to 300 feet from the main channel. Since 1950, water supply for Des Moines has been augmented by direct pumping from the Raccoon River.

WATER QUALITY

14. No intensive water quality studies of the Raccoon River or Walnut Creek have been accomplished. Because the project is not

expected to have a significant direct impact upon existing water quality, no intensive studies are anticipated. From a biological standpoint, the presence of a relatively good fishery resource in both streams would indicate that water quality would be generally fair to good.

ARCHAEOLOGICAL AND HISTORICAL CONSIDERATIONS

15. An intensive investigation to inventory and assess the culturally significant resources within the project area was made. All archaeological, historical, and architecturally significant sites, as well as previously recorded sites located within the project area, are summarized from a report entitled "An Intensive Archaeological, Historic, and Architectural Survey, Local Flood Control Project, West Des Moines, Iowa," prepared by Environmental Research Center, Iowa City, Iowa, dated 9 October 1974. Plate E-1 is a site location map.

16. Archaeological Sites, other than those previously recorded, prehistoric or historic aboriginal manisfestations were not located in the recent investigation. One previously recorded site is considered by some as one of the most important of the known sites in the central Des Moines River valley, however, this opinion is not widely shared by professionals. Site 13PK38 is not within the project area and is not directly affected by the project but it does illustrate the possible type of sites which may be present within the project area and the various cultural traditions associated with these sites. It also aids in evaluating the site density potential of the project area. Preservation of this site is important. Table E-2 presents a summary description of site 13PK38.

17. Historical Background of the area is not well documented. There is little record of the early occupation of the present-day Des Moines area by historic aboriginal populations. There is no indication of a permanent Indian settlement in the area until the transfer of the Sauk and Fox Agency from Wapello County to Fort Des Moines in 1843. Between 1843 and 1846, the region was controlled by Fort Des Moines and was under Military rule.

18. Central Iowa opened to Euro-American settlers on 11 October 1845. This resulted in a rapid population increase in the Fort Des Moines area. It also signalled the end of the Sauk and Fox occupation of the area as they were subsequently moved to the Kansas Territory. Although population increased steadily, without bridges across the Des Moines, Raccoon Rivers, and Walnut Creek growth during the first quarter-century was restricted to the triangular area formed by the junction of the Des Moines and Raccoon Rivers. First settlements were made in this area and it remains the core of the central business district.

19. After construction of toll bridges began in 1868 growth across the rivers increased but it was not until the construction of free bridges in the late 1880's that traffic could flow freely. Des Moines did not hold all those it initially attracted, and the city did not experience rapid growth until after 1866, when the first railroads arrived. From the start, Des Moines has been a major focus of distribution rather than a manufacturing center.

20. Des Moines' rapid development was aided by a variety of advantages:

- The area had immediate access to coal, gravel, and limestone.

- Access to the State's largest internal river provided opportunity for water power and water transportation.

- It has been an important political location.

- Railroad service is available.

21. Although there is little of cultural significance within or adjacent to the designated project area because of urban and industrial utilization, it should be noted that much of the area within the flood plain has a lengthy history of human settlement.

22. One historical site has been entered on the National Register of Historic Places. This site, NHP-PK1, is located on plate E-1 and described in table E-2. This site will not be affected by project construction.

23. Architectural Sites include a National Historic Site located close to the proposed project. In addition, several structures within the designated survey area were already listed in the Iowa Inventory of Historic Places. These are tabulated in table E-2.

24. The flood plain area covered by this architectural survey is shown on plate E-1. The area includes a large part of the central portion of the city of West Des Moines, and some parts of the city of Des Moines.

25. Significant Considerations. There is no apparent impact on known archaeological, historical, and architectural resources within the proposed project area. However, there may be undiscovered sites disturbed by project construction. The cultural sequence of the West Des Moines--Des Moines Project area is described on table E-3.

Table E-2

SUMMARY OF LOCATION AND POSSIBLE IMPACT ON KNOWN CULTURAL RESOURCES

Site Number	Survey Unit	Cultural Significance	Site Location	Site Type	Cultural Association	Project Impact	Recommendations
13PK38	S.U.1	Archaeological	Bluff	Cemetery	Great Oasis	Outside Designated Project Area No Apparent Impact	Previously recorded. Destroyed by construction. Further Surface Collecting in general area.
NHP-PK 1	S.U.3	Historical	Secondary Terrace	Private Home	Historic Euro/ American	No Apparent Impact	Previously recorded National Register Site. Caution exercised in general area
IHP-PK1	S.U.2	Architectural	Secondary Terrace	Commercial	Historic Euro/ American	No Apparent Impact	Previously recorded in Iowa Inventory of Historic Places
IHP-PK2	S.U.2	Architectural	Secondary Terrace	Commercial	Historic Euro/ American	No Apparent Impact	Inclusion in Iowa Inventory of Historic Places
IHP-PK3	S.U.2	Architectural	Secondary Terrace	Commercial	Historic Euro/ American	No Apparent Impact	Inclusion in Iowa Inventory of Historic Places
IHP-PK4	S.U.2	Architectural	Secondary Terrace	Commercial	Historic Euro/ American	No Apparent Impact	Previously recorded in Iowa Inventory of Historic Places
IHP-PK5	S.U.2	Architectural	Secondary Terrace	Commercial	Historic Euro/ American	No Apparent Impact	Previously recorded in Iowa Inventory of Historic Places
IHP-PK6	S.U.2	Architectural	Secondary Terrace	Commercial	Historic Euro/ American	No Apparent Impact	Inclusion in Iowa Inventory of Historic Places
IHP-PK7	S.U.2	Architectural	Secondary Terrace	Government	Historic Euro/ American	No Apparent Impact	Previously recorded in Iowa Inventory of Historic Places
IHP-PK8	S.U.2	Architectural	Secondary Terrace	Housing	Historic Euro/ American	No Apparent Impact	Inclusion in Iowa Inventory of Historic Places
IHP-PK9	S.U.2	Architectural	Secondary Terrace	Church	Historic Euro/ American	No Apparent Impact	Inclusion in Iowa Inventory of Historic Places
IHP-PK10	S.U.2	Architectural	Secondary Terrace	Commercial	Historic Euro/ American	No Apparent Impact	Previously recorded in Iowa Inventory of Historic Places

Table E-3

TENTATIVE CULTURAL SEQUENCE OF THE WEST DES MOINES PROJECT AREA

GENERALIZED CULTURAL ASSOCIATION	SUPPORTIVE EVIDENCE
Historic Early Settler	Numerous Ethno-Historic records and accounts available.
Historic Aboriginal	Ethno-Historic records of Sauk and Fox occupation. Poweshiek & Hard Fish both had encampments near the confluence of the Raccoon & Des Moines Rivers.
Proto-Historic	Oneota manifestations reported by Keyes, Wheeler, McKusick and others. Oneota components of the Moingonia Phase reported by Gradwohl. Presence of Shell-tempered ceramics and artifact assemblages associated with Oneota culture. 13PK38 apparently contains a Great Oasis component. The Mechan-shell site reportedly contains Great Oasis materials.
Woodland	Various mound groups & sites reported by Keyes, Wheeler, Gradwohl and McKusick. Corner-notch projectile point from 13PK36, located on Four Mile Creek.
Archaic	Stemmed projectile point recovered from 13PK37 on Four Mile Creek. Archaic style points observed in local collection by McKusick and Ries. Archaic sites reported by Gradwohl.
Paleo-Indian	Unconfirmed report of a Plano-like point found in West Des Moines locality (Musgrove, personal communication).

26. Generally, the original botany of the area was characteristic of either a moist woods or a flood plain ecology. However, disturbances by man, including grazing, agriculture, and construction activities have greatly altered plant species and their distribution.

27. Today, some of the best remaining evidence of the original plant ecology is found just outside Brown's Woods. Only the small flood plain portion of these woods is situated within the project area. This approximate 480-acre tract (total acreage) shown on plates E-17, 18, and 19 is principally timbered upland (oak-hickory Association), but includes about 40 acres of wooded flood plain in a narrow strip situated south of the Raccoon River and immediately west of the western city limits of Des Moines.

28. Denman Woods also shown on plates E-17, E-18, and E-19 is the most extensive area of native woodland remaining in the project area. It exists largely because of its' location within the Des Moines city park system. Denman Woods is situated northeast of Brown's Woods. Its' western edge extends upstream from the confluence of the Raccoon River and Walnut Creek.

29. Brown's Woods and Denman Woods serve as habitat for a great number of species, and encompass 2,054 acres of habitat area. Although much of the timber is mature, especially in Brown's Woods, it does not qualify as a Climax type. The bur oak-basswood (Quercus macrocarpa-Tilia Americana) Association dominates much of the Moist Woods habitat type. Shagbark hickory (Carya ovata) and red oak (Quercus borealis) are also important in the overstory.

30. Prominent woody understory species include hophornbeam (Ostrya Virginiana) and dogwood (Cornus sp.).

31. Woody plants found within the flood plain zone are characterized by a Blackberry-Walnut (Celtis occidentalis-Juglans nigra) Association, with a generous admixture of bur oak (Quercus macrocarpa), elm (Ulmus sp.), and green ash (Fraxinus pennsylvanica). The more important woody understory species in this zone include gooseberry (Ribes sp.), coralberry (Symphoricarpos orbiculatus), and elderberry (Sambucus canadensis).

32. Except for American elm, the wooded areas within the project limits have a vigorous, healthy stand of deciduous trees and shrubs which are fairly typical of flood plain situations throughout the Midwest. Periodic flooding has influenced the composition of species. Younger trees prevail in most sectors, with little evidence of over-maturity of disease among most species. Logging, flooding, grazing, and motorcycle and trail bike activities have left their scars in some areas, resulting in the extensive second growth conditions which prevail. Pure stands exist with a variety of overstory species occasionally becoming locally dominate by a single species such as slippery elm, green ash, black walnut, or hackberry. American elm, once one of the most important constituents in Brown's Woods and Denman Woods, is becoming conspicuous by its absence, for Dutch elm disease has taken a heavy toll in this area.

33. Generally, the flood plain understory is fairly open and park-like. Such species as greenbrier, coralberry, gooseberry, and elderberry show up most consistently. However, there are many areas--along the existing Walnut Creek levee, for example--where there is little understory except for a variety of herbaceous plants, principally annuals.

34. Aquatic plants are relatively uncommon in the project area. Walnut Creek and the Raccoon River transport great quantities of silt each year, making the establishment of rooted plants very difficult. Water quality, other than exhibiting moderate to heavy turbidity, is generally satisfactory for plant growth.

35. Three gravel pit lakes occupy about 90 surface acres in the gravel mining area along the southwestern end of the study area. These lakes continue to undergo great physical change from sand and gravel mining operations which are expected to continue for another 15 years. Ultimately, 200 surface acres of lake-type habitat are anticipated. Aquatic plants have not become established in most of this water.

36. The rich diversity of high grade habitat supplied by Brown's Woods and Denman Woods adjacent to the water of Raccoon River and Walnut Creek supports a great variety of birds, mammals, fishes, reptiles, and amphibians. The well-vegetated stream corridors and connecting woodlands provide travel lanes for numerous terrestrial, arboreal, and aquatic or semiaquatic species. Outside these corridors, man's activities, including urban development for residential or industrial purposes, highway construction, gravel or sand mining operations, etc., have resulted in a sharp reduction of wildlife, both in species number and variety.

37. In terms of total numbers, as well as species, Denman Woods supports a much greater population of terrestrial and arboreal animals per acre of habitat than any other habitat observed within the project area. Mammal and bird species are highly diverse within the woodland community. However, many species depend upon adjacent habitat types, especially in foraging for food. The most productive habitat zones within the project (for terrestrial and

arboreal species) are wooded areas which border pastureland, weed patches, natural openings, or streamside habitat.

38. Except for insects, birds are the most abundant for of animal life, at least in total species. Bird watching and photography are popular pastimes, especially in Denman Woods. The Des Moines Audubon Club is an especially active group and they have listed 287 species (or subspecies) in their Polk County Checklist. A high percentage of these species have been observed within Denman Woods or Brown's Woods but all observations are from Polk County. Aside from their aesthetic and recreational values, this high population of birds contributes an economic benefit not readily measurable. Their contribution to insect control, especially mosquitoes, is substantial. For the most part, these species could be expected to occur within the project area, during at least some period of the year, either as migrating birds or summer or winter residents.

39. The only bird which appears in the United States List of Endangered Fauna is the Brown Pelican (Polecanus occidentalis). It appears in the Polk County list as an "accidental," apparently a highly unusual migrant record.

40. Although mammals are well distributed throughout the project area the species list is relatively short. The Raccoon River, Walnut Creek, and the gravel pit lakes provide corridors or travel lanes which are well used by such species as mink, raccoon, and deer. Other species, tied almost entirely to the streams or gravel pit lakes, include the beaver and the muskrat. Foxes and skunks range throughout most of the area in their quest for food. Such species as cottontails, moles, pocket gophers, ground squirrels, and mice are highly vulnerable to flooding. Following floods

they tend to reinvade the flooded areas, with populations building up during cycles of low-water years, then falling dramatically following a flood. Populations of most mammalian species, especially those with limited mobility, are currently at low levels in the project area. Of the larger mammals, deer and raccoon populations are moderate to high mainly near the streams and in Brown's Woods and Denman Woods.

41. At the higher elevations cottontails, opossums, and fox squirrels, together with chipmunks, and other small rodents are more plentiful.

42. Fox squirrels are the most abundant mammals commonly seen. They are plentiful in Denman Woods and Brown's Woods and add considerable color and interest to these areas. Within the city limits of West Des Moines or Des Moines opportunities for harvest of mammals on the list are very limited. Mammals serve their most useful purpose in this area in adding to scenic and recreational values, especially within the parks.

43. There have been no checklists of reptiles and amphibians developed specifically for the project area. However, such studies have been conducted in Polk County. Dr. James L. Christiansen and his students at Drake University have collected specimens and recorded them on range maps. Most of the specimens have been observed or collected along the Lower Raccoon River or Walnut Creek.

44. There are no known species of mammals, amphibians, or reptiles within the project area that are presently on the United States List of Endangered Fauna, May 1974.

45. In the project area there are approximately 58 species of

warm water fishes within the Lower Raccoon River system. Of these, 15 to 20 species are taken regularly by area fisherman.

46. Channel catfish, flathead catfish, carp, white bass, smallmouth bass, sunfishes, crappies, suckers, and redhorse are commonly taken in the Lower Raccoon. Fishing is more seasonal and sporadic in Walnut Creek, which has low water problems during much of the year. Catfish, carp, and crappies are the more popular species taken in the gravel pit lakes. Much fishing is done along the Lower Raccoon River, the adjacent gravel pit lakes, and Walnut Creek.

47. There is less fishing and fewer species caught in Walnut Creek, although at times the stream provides good fishing opportunities for crappies, bluegills, channel catfish, black bullheads, carp, and bass.

48. Entry to lower Walnut Creek via the existing levee, adjacent to bridge crossings, and at other points provides full and unrestricted access to the stream at several places. Entry to some portions of the Raccoon River is more difficult, due to lack of enough good access points.

49. The gravel pit lakes are undergoing a severe and continuing transformation, due to activities connected with sand and gravel removal. Fishing in the easternmost lake (approximately 45 surface acres) is already significant. The sand and gravel company allows fishing in this area, but access points are limited and bank fishing is generally crowded.

50. Two fish species are classified as "rare" by the State of Iowa. These are: (1) black nose shiner (Notropis heterolepis)

and (2) western sand darter (Ammocrypta clara). These species are on the national list of "Threatened Fishes of the United States." Both species were caught in the area before 1948 but their current status in the area is unknown.

RECREATION AREAS

51. Numerous and diverse outdoor recreational opportunities exist in the project area, but they are largely concentrated in the city parks, especially in the Denman Woods sector. Additional opportunities center on the Raccoon River, Walnut Creek, and the gravel pit lakes.

52. The more important outdoor recreation activities in the project area include:

* Hiking

* Nature study (including bird watching, and plant and animal study)

* Fishing

* Bicycling

* Picnicking

* Motorcycling and trail biking (Motorized)

* Pleasure driving

- Wildlife and nature photography

- Swimming (pit lakes, mainly)

- Canoeing (a limited activity mainly on Lower Raccoon River)

- Horseback riding (mainly on bridle trails in Denman Woods)

- Skiing (cross country) especially on or along Walnut Creek and portions of Raccoon River)

- Tennis (city parks and playgrounds)

- Organized games (softball, baseball, field hockey, etc., on city playground areas)

53. Three city parks administered by the Waterworks Department provide most of the outdoor recreational opportunity within Des Moines. These parks are located on or near either Walnut Creek or Raccoon River, within the Des Moines city limits. They are either adjacent or close to the eastern limits of the project area. Greenwood Park (31 acres), Ashworth Parks (63.5 acres) and Waterworks Park (1,430 acres) are all components of the wooded complex known locally as Denman Woods. Although readily accessible to and heavily used by area recreationists, these parks are superb examples of parks serving a large audience, while retaining their primitive, wilderness qualities.

54. In West Des Moines and environs, the 45-acre gravel pit lake, Walnut Creek, Raccoon River, and a portion of Brown's Woods support most of outdoor recreational opportunities, except of course, for city playgrounds and ballpark areas.

55. An estimated 90 percent or more of the indicated recreational use comes from Polk County, with nearly all of this originating in Des Moines or West Des Moines.

56. Polk County Conservation Board owns and administers Brown's Woods, the northern tip of which is within the project's area of impact. Polk County Conservation Board is developing a long-range plan for this tract.

57. In general, the Des Moines portion of the project area is well served, from an outdoor recreation standpoint. Ashworth Park and Greenwood Park are heavily used. Waterworks Park, slightly downstream and east of the project area, is well provided with back roads, bicycling and hiking trails, and bridle paths. However, much of this extensive park system still essentially remains a wilderness area.

58. West Des Moines city planning includes a cooperative long-range planning effort between the city government, Iowa Conservation Commission, Polk County Conservation Board, and Martin-Marietta Corporation to fully develop the recreational potentials of the gravel pit lakes. These plans are expected to include provisions for camping, picnicking and other demonstrated needs of the times.

POPULATION

59. The city of West Des Moines had a 1970 population of 16,441. Historical population is shown in table E-4.

Table E-4

HISTORICAL POPULATION

	Population	Change	% Increase	Annual Increase
1940	4,252	1,363	32	2.8%
1950	5,615	6,334	113	7.8%
1960	11,949	4,492	38	3.2%
1970	16,441	12,189	289	4.6%

60. The central Iowa Regional Association of Local Governments has projected the population of West Des Moines to be 25,000 in 2000. Based on this projection, table E-5 shows the estimated projected population.

Table E-5

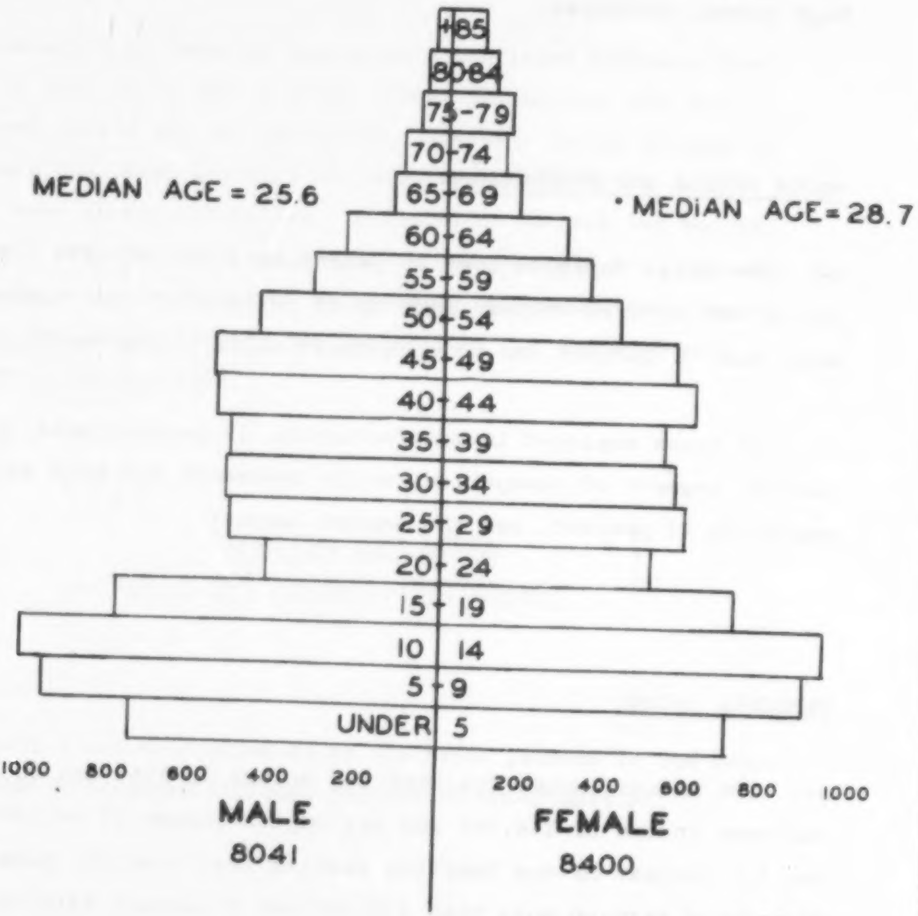
PROJECTED POPULATION

1970	1980	1990	2000	2010	2020
16,441	19,200	22,000	25,000	26,800	28,000

61. The characteristics of the population of West Des Moines are generally those typical of young families. Figure 1 shows the general demographic characteristics. The nonwhite population is less than 1 percent of the total. There are no unique features of the population that are significant.

FIGURE I

INDEX OF AGING = 20
DEPENDENCY RATIO = 63
UNDER 14 & OVER 65 VS. 15-65
SEX RATIO = 96
MEDIAN AGE = 27.3



WEST DES MOINES
POPULATION PYRAMID

62. Based on back data, the population in the flood plain area is not typical of the city population. The flood plain population is older; 14 percent over 62 versus 8 percent for the city, and 34 percent under 18 versus 38 percent. Thirty-five percent of the cities population over 62 reside in the flood plain. The flood plain population is about 3,344 or 20 percent of the city, with 23 percent of the homes in West Des Moines located there.

63. The educational level is fairly high in West Des Moines with medium school years completed, almost 13, and with about 80 percent high school graduates.

MAJOR SKILLS AND OCCUPATIONS

64. The total employed over 16 years was 6,937 in 1970. Professional and kindred workers made up 19 percent of this number and more than 70 percent can be considered white collar workers.

65. Of those employed in manufacturing, 19 percent make up the largest segment of occupation, while insurance and real estate, employing 13 percent, are the second largest.

PERSONAL INCOME

66. The median income for West Des Moines in 1969 was $13,408 with the mean income of $14,390 and per capita income of $4,926. There was 4.9 percent of the families earning less than the poverty level, 41 percent earning more than $15,000 and 9 percent earning more

than $25,000. Based on the value of homes, the population of the flood plain has a substantially lower income level. The average value of homes in West Des Moines was $23,500 while the average value of homes in the flood plain was $11,100. Sixty-nine percent of the flood plain residents own their own homes as compared with 79 percent for the city.

DEVELOPMENT AND ECONOMY

67. Population projections indicated a continued increase from 16,441 in 1970 to 25,000 in 2000. Other projections for West Des Moines itself are not available. However, in the absence of other data the OBERS projections provide the statistics which are the most likely estimators. Projections for the Des Moines, Iowa, SMSA are available and are presented in table E-6. Because the growth rates in the towns surrounding Des Moines are greater than for Des Moines itself, the projections for the SMSA make conservative projections.

PROBLEMS AND NEEDS WEST DES MOINES--DES MOINES

68. Flooding was determined to be the major problem in the basin. Other needs considered included recreation opportunities.

Table E-6

SMSA 061 Des Moines, Iowa **1972-E OBERS Projections**

Population, Employment, Personal Income, and Earnings by Industry, Historical and Projected, Selected Years, 1950–2020

	1950	1962*	1969	1970	1971	1980	1985	1990	2000	2020
Population, midyear	226,350	273,950	285,213	286,604	292,880	324,900	341,900	359,600	391,100	451,100
Per capita income (1967 $)	2,549	3,037	3,721	3,862	3,913	5,300	5,900	6,700	8,800	14,100
Per capita income relative (U.S.=1.00)	1.24	1.17	1.08	1.11	1.10	1.11	1.10	1.10	1.09	1.07
Total employment	95,033	107,778		124,175		153,600	161,700	170,200	190,000	212,100
Employment/population ratio				.43		.47	.47	.47	.49	.47
					In Thousands of 1967 Dollars					
Total personal income	581,564	832,109	1,061,340	1,106,851	1,146,090	1,722,000	2,049,400	2,438,900	3,479,900	6,377,800
Total earnings	508,966	730,791	973,976	1,001,880	1,033,886*	1,533,600	1,799,600	2,111,700	2,945,300	5,241,900
Agriculture, forestry and fisheries	16,995	7,096	11,362	12,612	9,880	23,400	24,600	25,800	29,700	38,900
Agriculture						23,400	24,500	25,700	29,600	38,900
Forestry and fisheries						(S)	(S)	(S)	(S)	(S)
Mining	2,193	1,298	1,980	1,893	1,974	1,800	1,800	1,900	2,000	2,200
Metal										
Coal										
Crude petroleum and natural gas						1,800	1,800	1,900	2,000	2,200
Nonmetallic, except fuels										
Contract construction	35,837	38,431	62,228	66,232	67,014	85,900	99,300	115,100	155,400	258,500
Manufacturing	112,889	161,445	223,506	218,065	224,321	321,100	372,700	432,600	577,800	953,700
Food and kindred products						28,800	30,100	31,400	35,100	43,200
Textile mill products						(S)	(S)	(S)	(S)	(S)
Apparel and other fabric products						1,700	1,800	1,800	2,000	2,400
Lumber products and furniture						5,800	6,700	7,700	10,000	15,300
Paper and allied products						8,900	10,200	11,800	15,300	23,800
Printing and publishing						55,400	60,000	67,400	87,000	140,300
Chemicals and allied products						8,500	10,000	11,600	15,900	20,500
Petroleum refining						(S)	(S)	(S)	(S)	(S)
Primary metals						(S)	(S)	(S)	(S)	(S)
Fabricated metals and ordnance						21,700	23,500	25,500	29,100	36,000
Machinery, excluding electrical						69,200	77,700	87,300	108,300	138,900
Electrical machinery and supplies						(S)	(S)	(S)	(S)	(S)
Motor vehicles and equipment						(S)	(S)	(S)	(S)	(S)
Transportation equip., excl. mtr. vehs						12,100	13,800	15,700	19,700	28,700
Other manufacturing						108,800	138,000	170,000	252,300	475,900
Trans., comm. and public utilities	59,283	79,719	81,301	84,150	91,405	125,000	143,500	164,600	220,700	367,100
Railroad transportation						8,600	8,100	7,700	7,100	6,200
Trucking and warehousing						51,700	59,900	69,400	94,800	162,000
Other transportation and services						11,600	13,700	16,100	22,000	36,700
Communications						40,000	47,900	56,600	79,300	138,200
Utilities (elec., gas, sanitary)						12,400	13,400	14,600	17,400	23,900
Wholesale and retail trade	127,616	164,094	196,596	202,806	202,794	287,000	320,900	357,900	467,400	745,600
Finance, insurance and real estate	53,536	89,061	117,736	116,525	125,084	194,700	234,300	282,600	459,300	762,300
Services	56,934	107,871	149,351	158,254	162,620	294,100	365,900	462,500	715,800	1,470,700
Lodging places and personal services						17,900	17,600	20,200	23,500	30,800
Business and repair services						39,000	50,000	62,700	97,400	202,100
Amusement and recreation services						7,000	7,800	8,900	11,200	17,100
Private households						7,600	3,700	5,900	6,500	8,000
Professional services						221,600	285,600	364,700	577,200	1,212,600
Government	41,684	81,776	129,915	141,332	149,214	199,300	231,400	268,500	367,100	642,400
Federal government	15,766	23,581	32,619	37,853	39,476	57,200	68,100	81,000	112,900	214,800
State and local government	23,878	55,055	93,657	99,732	105,077	137,200	157,800	181,500	246,900	416,800
Armed forces	2,040	3,140	3,640	3,747	4,661	4,900	5,400	6,000	7,300	10,700

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*Employment is for 1960

a—represents 80.0 to 99.9 percent of the true value

b—represents 60.0 to 79.9 percent of the true value

c—represents 40.0 to 59.9 percent of the true value

d—represents 20.0 to 39.9 percent of the true value

e—represents zero to 19.9 percent of the true value

STATUS OF EXISTING PLANS AND IMPROVEMENTS

69. Several plans, improvements, or programs are either now implemented or are being considered in the Des Moines area.

EXISTING FLOOD PROTECTION

70. Structural and temporary measures have been used by the cities of Des Moines and West Des Moines to hold back floodwaters and protect lives and property. The city of West Des Moines successfully utilized the Chicago and Northwestern Railroad embankment as a frontline of defense against the Raccoon River floods in 1958 and 1973. The Raccoon River flood of record, which crested on 13 June 1947, overtopped the railroad embankments, causing widespread damage.

71. An existing levee was constructed along the right bank of Walnut Creek from the Chicago and Northwestern Railroad embankment north to about Grand Avenue. A levee was also constructed along the left bank of Walnut Creek from downstream of North Valley Drive upstream to about Grand Avenue. Walnut Creek flood flows, such as occurred in July 1973, flow overland upstream of Grand Avenue, however, and cause flooding landward of the existing levees. The left bank levee will be degraded in the near future by order of the Iowa Natural Resources Council.

72. Spoil bank levees have been placed on both banks of Jordan Creek between Fuller Road and the Chicago, Rock Island, and Pacific Railroads. The spoil bank levees effectively control flooding to about a 25-year-frequency event on Jordan Creek.

FLOOD PLAIN REGULATION

73. The city of West Des Moines does not have flood plain zoning. The flood hazard area in West Des Moines contains industrial, residential, commercial, agricultural, and unclassified zoning as shown on plate F-1.

74. The city of Des Moines has existing "U-1--Flood Plain District" zoning as shown on plate F-1. The "U-1" district is intended to encompass areas of the city which are subject to flood hazard. Some areas which are currently zoned residential and commercial are within the flood hazard area.

75. The cities of West Des Moines and Des Moines will be required to refine their existing zoning regulations in the near future to comply with the requirements of the Flood Disaster Act of 1973 (PL 93-234), relating to flood insurance.

76. The Iowa Natural Resources Council (INRC) has been authorized to establish and enforce programs for control, utilization, and protection of surface and ground water resources within the State. The Resources Council is currently regulating existing and future development within the flood plain area of the study area in accordance with the Iowa Water Resources Code. The primary purpose of the regulating program is to control development within the flood plain.

FLOOD PLAIN INSURANCE

77. The cities of Des Moines and West Des Moines have applied and have been declared eligible by the Department of Housing and Urban

Development, Federal Insurance Administration, for sale of flood insurance. The cities are currently enrolled in the emergency program. Special flood hazard maps have been prepared and persons living within the flood hazard areas may purchase flood insurance.

78. The majority of structures within the special flood hazard area along the right bank of Walnut Creek and the left bank of the Raccoon River are subject to levels of inundation between four and eight feet. Compliance with the Federal Insurance Administration rules and regulations, will require future development or major modifications to existing development to be above or flood proofed to the 100-year-frequency flood elevation. This requirement will probably halt new development within the majority of the flood plain area. Existing developments in the flood plain which would be destroyed by disasters such as fire or tornadoes would probably relocate out of the flood plain area.

FLOOD PLAIN WARNING AND FORECASTING

79. The National Oceanic and Atmospheric Administration, National Weather Service, provides a general flood forecasting service for the Upper Mississippi River Basin. The flood warnings and statements on flood conditions are transmitted to city officials as well as newspapers and radio and television stations in the basin. The services available include flash flood warnings based on radar coverage of the basin and major flood forecasts based on radar coverage, numerous rainfall reporting stations, river gages, anticipated weather conditions, and hydrologic factors. When hydrologic or meteorologic conditions warrant, a flash flood watch or warning are issued by the Des Moines River District Office.

BRIDGES

80. The city of Des Moines constructed a new bridge at 63rd Street across Walnut Creek upstream of Grand Avenue and realigned the Walnut Creek Channel between 63rd Street and the Chicago, Milwaukee, St. Paul and Pacific Railroad bridge in 1969. The work included an overflow section on 63rd Street south of the new bridge.

81. The Iowa State Highway Commission recently constructed a new 63rd Street bridge across the Raccoon River. The work included raising the north approach roadway about 5 feet.

82. The Center Street bridge across Walnut Creek has been removed and will not be replaced.

FAIRMEADOWS CREEK

83. Fairmeadows Creek, with a drainage area of 1.4 square miles, flows through an industrial section of West Des Moines before entering the Raccoon River, as shown on plate E-17. A cement producing firm has excavated a storm water ponding area upstream of its plant and has constructed a paved channel through the plant area to control flows of Fairmeadows Creek.

FLOOD PROBLEMS

84. The West Des Moines--Des Moines study area is subject to flooding from the Raccoon River, Walnut Creek, and Jordan Creek.

This section reports the stream characteristics of the Raccoon River, Walnut Creek, and Jordan Creek. This information defines the flood hazard area.

STREAM CHARACTERISTICS--RACCOON RIVER

85. The Raccoon River drainage area above Walnut Creek is approximately 3,535 square miles. Flow records since 1915 are available for the Raccoon River at Van Meter, Iowa, which has a drainage area of 3,441 square miles. During the period of record, flows have varied from a low of 2,020 c.f.s. in 1934 to a high of 41,200 c.f.s. in 1947. A frequency curve was computed using 59 years of record, zero skew coefficient and expected probability adjustment. The frequency curve for the project location was adjusted by the square root of drainage area ratio. This curve is shown on plate E-2. Flow duration data, as shown on plate E-3, was obtained from the USGS publication, "Statistical Summaries of Iowa Streamflow Data" (1974). A summary of major Raccoon River floods is shown on table E-7.

Table E-7

SUMMARY OF MAJOR FLOODS--RACCOON RIVER AT VAN METER

Order of Magnitude	Peak Discharge c.f.s.	Year of Crest
1	41,200	1947
2	35,600	1973
3	35,200	1917
4	35,200	1958
5	32,300	1960
6	32,000	1926

STANDARD PROJECT FLOOD--RACCOON RIVER

86. The Raccoon River watershed above Van Meter was subdivided into three basins for which unit hydrographs were published in "Master Reservoir Regulation Manual - Red Rock Reservoir - Appendix A - 1968." Using these unit hydrographs and the procedures outlined in EM 1110-2-1411, and using appropriate losses, Standard Project Flood hydrographs for three subbasins were computed. These flood hydrographs were then routed to Van Meter to yield the combined Standard Project Flood hydrograph for the entire basin above Van Meter, which is shown on plate E-4. The peak flow was then adjusted for the project location by the square root of drainage area ratio. The peak at the project location is 143,000 c.f.s.

STREAMFLOW CHARACTERISTICS--WALNUT CREEK

87. Walnut Creek drains about 85 square miles before its confluence with the Raccoon River. The USGS established a gage on the Walnut Creek in October of 1971. During this short record, a major flood occurred in July of 1973, with a peak flow of 9,000 c.f.s. Since the length of record is insufficient for any meaningful statistical analysis, synthetic procedures were followed to estimate the frequency curve. Using seven central Iowa streams of similar characteristics, a plot of mean annual flood vs. drainage area was developed as shown on plate E-5. The standard deviation was computed using equation 18 of the publication, "Floods in Iowa - A Comparative Study of Regional Flood Frequency Methods - Bulletin 12 - Iowa Natural Resources Council."

Using the above mentioned mean and standard deviation, a preliminary frequency curve was developed as shown on plate E-6. This frequency curve was developed with zero skew coefficient and expected probability adjustment. The USGS had previously developed a synthetic frequency curve using regional regression equations and a regional skew coefficient of -0.4, resulting in lower estimates of discharge for a given frequency. The Iowa Natural Resources Council have been using flow frequency estimates within the range of the USGS estimate for regulatory purposes along Walnut Creek. A meeting was held between representatives of the Corps, the USGS, and Iowa Natural Resources Council to discuss the differences. The frequency curve and the error limits at 5 and 95 percent confidence interval for the Corps estimates are shown on plate E-6. The Iowa Natural Resources Council staff indicated that flow-frequency estimates for Walnut Creek which do not exceed the USGS estimates by one standard error of estimate at a given frequency level would be given consideration by the Resources Council. So, a frequency curve was computed using the sum of the original estimates of the USGS and standard error of estimate at respective frequency levels. This curve is also shown on plate E-7. This curve does not deviate significantly from the original Corps estimate and thus was used for the Walnut Creek flood control studies.

88. To strengthen the validity of this synthetic frequency curve, rainfall application procedures were undertaken. A unit graph was derived from the observed flood of 1973 which had 3 inches of runoff volume. The loss rates were also determined from this observed flood. Using this unit graph and rainfall excess of 100-year-recurrence interval, peak flow was determined and plotted on plate E-7 as a comparison with the frequency analysis. Similarly, using the procedures outlined in EM 1110-2-1411 and loss rates as derived earlier, Standard Project Flood hydrograph was estimated

and shown on plate E-8. The peak inflow of 27,500 is also plotted on plate E-7.

89. Flow duration data for the Walnut Creek at mouth were obtained from the Rock Island District's regional study made with 113 Iowa stations dated May 1972. The summary of this study is included on plate E-9. Flow-duration curve for Walnut Creek at mouth is shown on plate E-10.

STREAM CHARACTERISTICS--JORDAN CREEK

90. The drainage area of Jordan Creek at mouth is about 13 square miles. In the absence of flow records, a synthetic frequency curve was developed. The mean annual flood was obtained from plate E-5, and the standard deviation was computed by the equation 18 already referenced. The resulting frequency curve, with error limits, is shown on plate E-11.

91. A synthetic unit graph was developed using Clark's method for Jordan Creek at mouth. Time of concentration of 135 minutes was determined by Kirpich formula and attenuation constant 'R' was taken as 66 percent of the time of concentration which is reasonable for the Jordan Creek characteristics. Using the resulting unit graph and rainfall excesses as described earlier for 100-year-recurrence interval and Standard Project Storm, peak flows were computed and are shown on plate E-11. The Standard Project Flood hydrograph is also shown on plate E-12. Flow duration curve was obtained from the Rock Island District study shown on plate E-13.

WATER SURFACE PROFILES

92. Calculations of water surface profiles for the Raccoon River, Walnut Creek, and Jordan Creek were computed using a computer program HEC-2 and Method I, of EM 1110-2-1409, titled "Backwater Curves in River Channels" dated 7 December 1959. Starting elevations for the Raccoon River were obtained from a discharge rating curve for Fleur Drive in Des Moines. Starting elevation for Walnut Creek and Jordan Creek were based on concurrent frequency flood elevations on the Raccoon River at the mouth of each tributary.

93. Values of roughness coefficient "n" used in Manning's equation were as follows:

- Raccoon River; .030 for channel, 0.070-0.080 for overbank.
- Walnut Creek; .040 for channel, .070 for overbank.
- Jordan Creek; .065 for channel, .045 for overbank.

94. Computations of backwater caused by existing bridges were made in accordance with the Bureau of Public Roads Publications--"Hydraulics at Bridge Waterways," dated 1960 and "Backwater Effects of Piers and Abutments," prepared by the Civil Engineering Section, Colorado State University, Fort Collins, Colorado, dated October 1957.

95. Water surface profile for the Raccoon River, Walnut Creek and Jordan Creek are presented on plates E-14, E-15, and E-16, respectively.

AREAS SUBJECT TO FLOODING

96, The occurrence of large floods on Jordan Creek, Walnut Creek, and the Raccoon River would inundate existing urban development in the study area. The urban areas subject to flooding are along both banks of Jordan Creek downstream of Fuller Road, along the left bank of the Raccoon River to the confluence of the river and Walnut Creek and along both banks of Walnut Creek from the mouth to Center Street. The area inundated is shown on plate E-18. The flood plain contains about 925 residences, 150 commercial firms, and 25 industries. The West Des Moines Municipal Waterplant is also located in this area.

97. Jordan Creek. The developed flood plain area of Jordan Creek is south of Fuller Road and is currently zoned industrial as shown on plate F-1. The left bank area has been developing over the past 10-15 years. The right bank area has only seen development with past 5 years. Relatively low flows on Jordan Creek are contained by spoil banks along the channel. Large floods on Jordan Creek would overtop the spoil banks and cause damage to development along the left bank and to three industries along the right bank. Other businesses on the right bank are above the elevation of the 100-year-frequency flood elevation of Jordan Creek.

98. Raccoon River. The flood hazard analysis of the Raccoon River indicates that flood events greater than about a 25-year-frequency event would overtop an existing railroad embankment and cause widespread damage to the downtown business district of West Des Moines and surrounding industrial and residential areas. A residential area within the city of Des Moines located

east of 63rd Street would also suffer damage. Floodwaters which overtopped the railroad embankment would be blocked to the east by an existing Walnut Creek levee, thus increasing flood heights and duration.

99. Walnut Creek. The primary flood hazard area along Walnut Creek is the right bank between the Chicago, Rock Island and Pacific Railroad embankment and Center Street. Large floods cause flooding of industrial and commercial development along Hoak Drive, of a business district along Grand Avenue, and of a residential area of Des Moines east of 63rd Street. A portion of a business area at Grand Avenue on the left bank also suffers flood damage.

100. Large floods on Walnut Creek could also cause some inundation of the downtown business district of West Des Moines. An estimate of the volume of floodwater which could reach the downtown area is difficult to determine, however.

101. Fairmeadows Creek. Flows in excess of the capacity of an existing ponding area on Fairmeadows Creek cause flooding of parts of West Des Moines. These flows have overtopped the Chicago and Northwestern Railroad embankment.

HISTORICAL DAMAGES

102. Flood damage surveys were conducted following the floods of 1947, 1958, and 1973 for the Raccoon River and Walnut Creek. Table E-8 indicates the level of flooding and corresponding flood damage updated to 1975 prices for the areas proposed for protection.

Table E-8

FLOOD DAMAGES

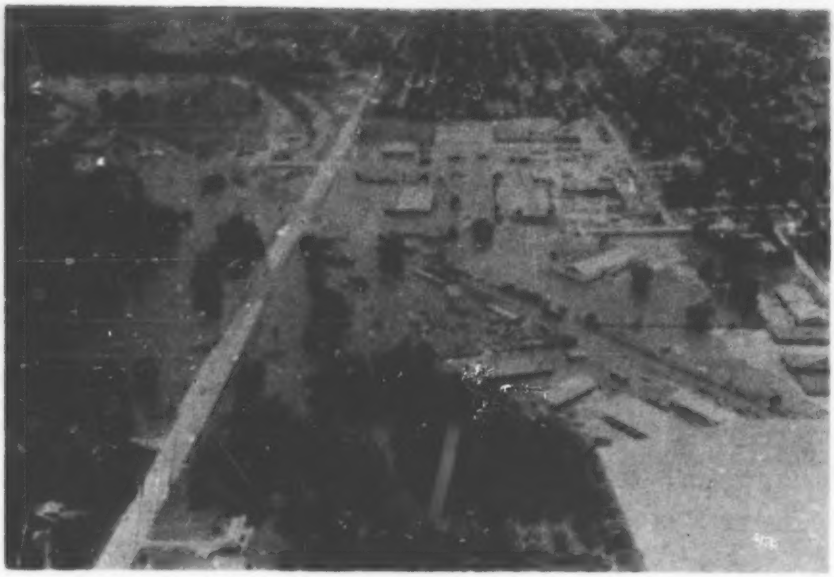
	Raccoon River		Walnut Creek	
Flood	USGS Gage at Van Meter	Damages	USGS Gage at 63rd Street Des Moines	Damages
Jun 47	21.37	$151,800	2/	$779,600
Jul 58	21.77	85,500 1/	2/	561,300
Jul 73	21.74	55,200 1/	17.72	792,500

1/ Flood fighting prevented major flood damage.
2/ The Walnut Creek gage did not exist at the time of these floods.

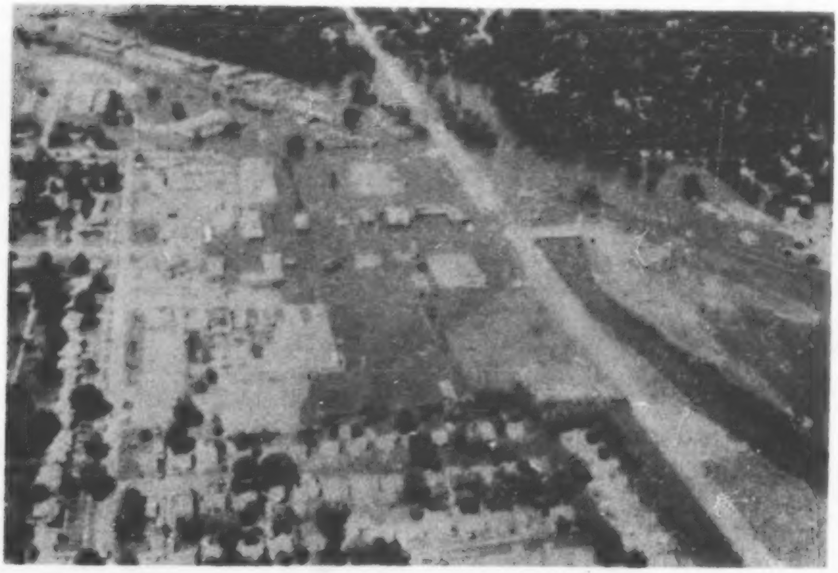
103. The 1973 flood on Walnut Creek is the flood of record. This flood occurred on the first of July, just three days earlier than the 4 July flooding of the Raccoon River. The flooding was caused by heavy rainfall which affected both basins. Due to the fast rise of Walnut Creek waters, little emergency action was possible during the flood of Walnut Creek. For the flood that followed on the Raccoon River, the city of West Des Moines prevented major flood damage by placing sandbags on the Chicago and Northwestern Railroad embankment. Flooding caused by the 1973 flood on Walnut Creek is demonstrated in the photographs following.

RECREATION NEEDS

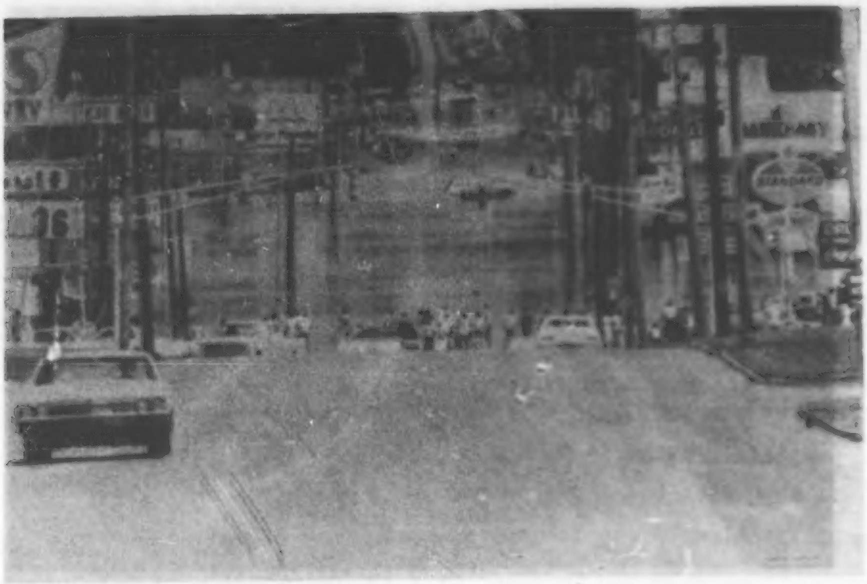
104. Additional opportunities for outdoor recreation are needed in West Des Moines. Improved access for fishing, boating, and canoeing is the greatest need. A drop for small boats and canoes is especially needed on the Raccoon River.



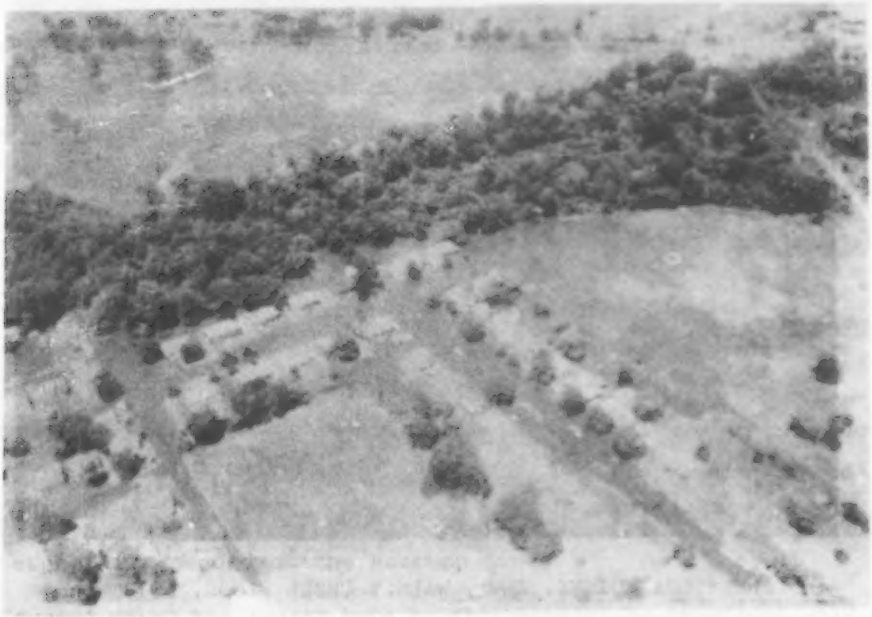
WEST DES MOINES, IOWA, WALNUT CREEK FLOOD, 1973
View near 63rd Street North of Grand Avenue
looking South along 63rd Street



WEST DES MOINES, IOWA, WALNUT CREEK FLOOD, 1973
View Southwest of intersection of 63rd Street and Grand Avenue
looking North generally along 63rd Street



WEST DES MOINES, IOWA, WALNUT CREEK FLOOD, 1973
View near 4th Street looking East along Grand Avenue



WEST DES MOINES, IOWA, WALNUT CREEK FLOOD, 1973
View just North of North Valley Drive looking Northeast

105. Need exists for a connecting link between Denman Woods and Brown's Woods, preferably in the general vicinity of the Raccoon River and 63rd Street. Hiking clubs, Boy Scout groups, bird watchers, and other nature study groups meet a severe obstacle in the form of very heavy traffic when they attempt to cross 63rd Street.

106. Another connecting link is needed to tie Des Moines bicycle trails and bridle paths in Waterworks Park, Ashworth Park, and Greenwood Park with the levee sector along Walnut Creek. This interconnection would promote considerably more use of this area by hikers, bicyclists and other outdoor recreationists preferring relatively passive forms of outdoor recreation amid beautiful, natural surroundings.

107. Ball parks and playgrounds are well supplied in some sectors of the project area. However, there is need for more such areas near the proposed levee alignment.

108. Improved and expanded recreational facilities are needed in the form of public access, parking areas, swimming beaches and small boat and canoe launching sites along the north shore of the gravel pit lake adjacent to Railroad Avenue and 63rd Street.

109. Picnic areas and camping areas are in short supply along the project reach of the Raccoon River and Lower Walnut.

110. The most logical site for camping and picnicking appears to be adjacent to the gravel pit lakes.

111. Recreational use data for the project area, expressed in terms of user days, is not readily available. Outdoor recreational use

generated in the metropolitan area of Des Moines and West Des Moines is great and steadily increasing. New facilities tend to be promptly and heavily utilized, according to city park personnel.

112. The Central Iowa Regional Planning Commission in a report entitled Initial Central Iowa Outdoor Recreation Plan, dated February 1972, recommended development of an urban trail along the full length of Walnut Creek from the Raccoon River through Des Moines, West Des Moines, and the western suburbs. The report also indicated a 10,260-acre deficiency of recreational lands by the year 2,000 A.D. The Polk County deficiency was by far the greatest projected for the eight county area. The greatest need for recreational lands in Polk County is for Class III (Natural Environment) lands, according to the cited report.

OTHER PROBLEMS AND NEEDS

113. Other water and related problems and needs of the study area are preservation of possible historically significant or potential archaeological sites and preservation of biological resources in the flood plain area.

IMPROVEMENTS DESIRED

114. The history of development within the Raccoon River, Walnut Creek, and Jordan Creek flood plain areas at West Des Moines and

Des Moines indicate a firm commitment to current locations and neighborhoods, and a willingness to bear the cost of annual flood fighting, if necessary. This is a real commitment because flood fighting costs have been severe in past years. City officials and occupants of the flood plain are anxious to eliminate these costs and to eliminate the uncertainties associated with potential flooding. Flood protection is needed to help stabilize and redevelop the downtown area of West Des Moines and the neighborhoods of West Des Moines and Des Moines surrounding the downtown area. The flood insurance program will provide reimbursement for residents of the flood plain and prevent additional future flood damage, but the physical characteristics of the flood plain will result in the long-term evacuation and relocation of the majority of structures in the flood plain.

115. Officials of the communities of Des Moines and West Des Moines have expressed a desire to develop a recreation plan that will meet the recreational needs identified in conjunction with a flood damage reduction plan.

FORMULATING A PLAN

116. General formulation and evaluation concepts used to formulate alternative plans for the West Des Moines-Des Moines study area are the same as those for the entire study.

PLANNING OBJECTIVES

117. Specific planning objectives for the West Des Moines-Des Moines area, based on an evaluation of existing conditions and the determination of problems and needs, are presented below.

* Reduce urban flood damages along the Raccoon River between the mouth of Walnut Creek and the mouth of Jordan Creek; along Walnut Creek from the mouth to Center Street; and along Jordan Creek from the mouth to Fuller Road.

* Preserve and enhance open space and associated recreation opportunities along the Raccoon River, Walnut Creek, and Jordan Creek.

* Preserve identified historical sites and potential archaeological sites within the flood plain area.

FLOODWAY DETERMINATION

118. Before evaluating alternatives to reduce flood damages, a preliminary analysis was made of a floodway and floodway fringe area along the Raccoon River, Walnut Creek, and Jordan Creek. A floodway consists of the stream channel and portions of the adjoining flood plain which can convey the 100-year-frequency flood

best copy available

flow confined by hypothetical levees on each bank and cause minor increases in stages above the stage the 100-year-frequency flood would reach under existing flood plain conditions. The floodway fringe is the land between the floodway and outer limits of the flood plain. Designating floodway limits conserves an unobstructed area to pass floodwaters. The floodway fringe can be developed, provided that the area is filled or that other flood proofing measures are taken. The designation of floodway and floodway fringe is required as part of the Federal Flood Insurance Program and is consistent with the rules and regulations of the Iowa Natural Resources Council. The Resources Council also requires that proposed levee alignments be consistent with floodway limits or that mitigative measures be taken for levee alignments which cause water surface profile increases greater than one foot for the 100-year-frequency flood event.

WALNUT CREEK

119. Levee alignments along Walnut Creek were located to conform with preliminary floodway limits being considered for adoption by the local communities. Future flood protection planning will consider floodway limits which are formally adopted by the communities.

RACCOON RIVER

120. A preliminary floodway has not been determined along the Raccoon River. Levee alignments considered would not increase stages of the 100-year-frequency flood. The proposed levees are set back far enough from the stream channel such that they will prevent inundation of developed areas but will not obstruct flow. Future planning will consider the floodway to be established in the project area.

JORDAN CREEK

121. Existing spoil bank levees along Jordan Creek presently confine flows downstream of Fuller Road. For this study, levee alignments were assumed set back from the channel a minimum of 100 feet. Future planning will consider the floodway to be established in the project area.

POSSIBLE SOLUTIONS

122. A variety of alternative measures were considered to satisfy the problems and needs of the study area. In addition to flood damage reduction, other needs that were considered include increasing recreational opportunities, preserving or creating open and green space along the Raccoon River, Walnut Creek, and Jordan Creek, and preserving archaeological and historical sites.

123. Solutions considered to meet the water-related problems and needs in the study area, particularly the reduction of flood damages, were separated into three principal categories: maintain status quo in the area, nonstructural and structural measures, and possible combinations of these measures. The extent of study given to each potential solution was established by first screening each alternative for its physical, political, financial, institutional, economic, and environmental feasibility. Alternatives passing these initial tests were compared with other potential solutions to show the extent of differences among alternative plans as a basis for reducing the number of alternatives to be considered in the selection of recommended plan. Continuous coordination was maintained with State, local, and Federal agencies having related programs or interests in the area. Alternative measures considered for flood damage reduction and related purposes in each of the three categories listed below.

- NO ADDITIONAL ACTION
  * Flood insurance.
  * Flood plain regulation.
  * Flood warning and emergency protection.

- NONSTRUCTURAL MEASURES
  * Permanent flood plain evacuation.
  * Combined flood proofing and evacuation.

- STRUCTURAL MEASURES
  * Upstream reservoir storage on the Raccoon River and Walnut Creek.
  * Levees and floodwalls.
  * Channel modifications.

NO ADDITIONAL ACTION

124. This alternative is considered the "no additional action" plan in that it assumes that the cities of Des Moines and West Des Moines will not undertake major structural (levees) or non-structural measures (flood proofing, evacuation) to reduce flood damages. The alternative involves flood plain regulation, flood insurance, flood warning system, and emergency flood fighting measures.

125. Flood Insurance. The cities of Des Moines and West Des Moines are enrolled in the emergency flood insurance program administered by the Federal Insurance Administration, HUD. The "no additional action" alternative assumes that the two communities will remain in the insurance program and that actuarial rates will be determined by a study authorized and funded by the Federal Insurance Administration, HUD. The actuarial rate study will involve determining floodways for streams in the study area and will furnish information necessary for each community to adopt appropriate flood plain regulations. Indications are that only a small percentage of qualified property owners are taking advantage of Federal flood insurance. On a regional basis, this program compensates for flood damages by spreading the cost over a wider area. However, this does not reduce flood damages; and, for the study area, average annual damages of about $803,000 would remain. The limitation of $30,000 coverage for small businesses would not significantly help the numerous large businesses in the flood plain, many with capital investments in the millions of dollars.

126. Flood Plain Regulation would prevent future development within the designated floodway and would require future development in the flood fringe area to be above or flood proofed to the 100-year-frequency flood elevation. About 8 to 10 existing businesses and residences may be within the final floodways established for Jordan Creek, Walnut Creek, and the Raccoon River in the study area. As discussed previously, the requirement that future development or replacement of structures in the flood fringe area be at or flood proofed to the elevation of 100-year-frequency flood would have major effects on the study area. New residential, commercial, or industrial development will probably not locate in the flood plain area. Such a loss of land use in an area committed to urban development would have adverse effects on the tax base of the community and the economic stability of the surrounding area. With flood plain regulations in effect, expected average annual damages to the study area would be about $803,000 because of the dense existing urban developments and the likelihood that geographic urban land-use patterns would not change appreciably in the foreseeable future.

127. A Flood Forecasting and Flood Warning System is presently available for the study area through the National Weather Service and the Rock Island District, Corps of Engineers. This system provides area officials and local news media with flood forecasts and warnings. Forecasting and warning systems alone would not provide sufficient flood protection in the study area. Estimated average annual remaining damages over a 100-year period would be $803,000. Flood forecasting and advance warning, together with

emergency measures such as construction of temporary flood barriers and temporary evacuation, provide some degree of protection, but the extensive remaining damages incurred by all types of flood plain development during past floods shows the serious limitation of such a plan as a long-term solution. Further, temporary evacuation of residents and personal property from threatened areas during each major flood places a severe burden on the manpower and financial resources of local communities. Both local finances and manpower, in many cases in short supply, must be diverted from ongoing maintenance and operation programs, or needed capital investment projects to conduct a temporary evacuation program. Local and other agency resources are further strained in providing necessary and often specialized transportation equipment, temporary lodging, and personal services to displaced residents.

128. Maintaining the status quo or recommending that no additional action be taken to alleviate flood and related problems would not burden local interests and the Federal Government with the financial costs associated with other alternatives. However, average annual damages estimated at $803,000 would remain as a severe social and economic burden to the people, despite existing flood plain regulations, the availability of flood insurance, and emergency flood warning and flood fighting techniques. The worry and anxiety during the flood seasons and massive community disruption during actual floods would continue. By restricting bottom land development, flood plain regulation would provide some flood damage reduction, especially to future structures and the natural riverine aesthetics would probably not change substantially.

Individuals owning property carrying a flood plain designation would have problems selling property and obtaining improvement loans since lending institutions are reluctant to finance homes in the flood plain. Federally subsidized flood insurance does not reduce flood damages but rather spreads the liability over a wider sector of the Nation. Existing levees would provide limited protection to localized areas. However, these levees do not conform to Federal standards for methods and materials.

NONSTRUCTURAL MEASURES

129. Permanent flood plain evacuation and a combined flood proofing-evacuation plan were nonstructural measures considered for the Des Moines-West Des Moines area.

130. Flood Plain Evacuation would provide for total evacuation of all flood damage-prone property from the flood plain and management of the vacated area as open space land. Over 925 houses and 175 businesses are located within the flood plain. All of these houses and the people living in them would have to be relocated. Of the many industries and businesses in the flood-prone areas, most are too large to be moved practically or economically. Estimated tangible costs for evacuating existing flood-prone structures would be approximately $50 million. Extensive adverse social impacts from such a plan would include: major disruption of existing physical, social, and cultural relationships;

increased costs to displace persons and businesses in seeking alternative housing; increased costs of new financing, the added burden of moving costs, and likely higher operating costs (rent and taxes) at a new location. The massive institutional and physical problems of this plan make its success very questionable. The ecological impact from the standpoint of natural systems would be generally beneficial since much of the currently developed lands could return to a more natural state. However, the environmental impacts of total flood plain evacuation would depend upon the area to which the existing urban developments were relocated. In the event that such relocations were confined to biological systems less sensitive than the bottom land areas, the long-term net effects would be beneficial. However, recovery of bottom land systems would require considerable time and demolition of existing structures would result in substantial quantities of solid waste. It is also likely that many of the structures would not be removed; therefore, the evacuated areas would remain scarred for some time.

131. Analysis also shows that a plan to limit evacuation to the three industries affected on the right bank area of Jordan Creek and to the 11 commercial firms and five residences on the left bank area of Walnut Creek would also be economically infeasible. However, the adverse impacts of evacuating these smaller areas would not be as severe as evacuating the entire flood plain area.

132. Combined Flood Proofing and Evacuation would provide for flood proofing all suitable structures within the 100-year flood

plain and evacuating all others. In general, any structure located more than 100 feet within the 100-year flood outline or having a first-floor elevation more than 2 feet below the 100-year flood level would be evacuated. Estimated first costs would exceed $35 million.

133. The social impacts of this alternative would be similar to those of total evacuation in that the large number of required relocations would result in loss of community structure and unacceptable inconvenience to local persons. A significant potential for health and safety problems would exist for the people remaining within the flood plain. Typical remaining problems could include well contamination, vector production, and interrupted access to flood proofed structures during severe floods.

134. The environmental impacts of combined flood proofing and evacuation would be similar to the situation expected with total evacuation. A smaller area of flood plain could recover its natural characteristics of wildlife and vegetation Correspondingly, a smaller area of some other system would need to be disturbed to provide for relocations

STRUCTURAL ALTERNATIVES

135 Several structural measures were also evaluated.

136. Reservoirs were considered upstream of the study area on the Raccoon River and Walnut Creek. Both reservoirs were found to be economically infeasible. While reservoirs could reduce flood stages of larger floods in the study area by about 3 to 4 feet along the Raccoon River and 1 to 2 feet along Walnut Creek, such a reduction in flood stages would also require additional flood reduction measures, such as levees, to solve the flood problem in the study area. Therefore, upstream reservoirs were not considered further as a solution to the flood problem.

137. Levees and Floodwalls were considered to protect existing development for three areas, as shown on plate E-18. Because of the high cost, floodwalls were considered only where existing development would preclude a levee. The alignments also considered preliminary floodway limits in accordance with State of Iowa criteria. Where levee alignments were considered streamward of the preliminary floodway limits, mitigative measures for existing development on the opposite bank were considered.

138. Preliminary economic analysis considers levels of protection between a minimum level equal to the 100-year-frequency flood elevation and the desirable level of protection for urban areas equal to the Standard Project Flood. Environmental impacts are also determined for each level of protection.

139. Alignment 1, as shown on plate E-18, extends from high ground along the left bank of Jordan Creek to the confluence of that creek with the Raccoon River and then generally along the south side of the Chicago, Rock Island and Pacific Railroad tracks to an existing levee along the right bank of Walnut Creek. The alignment then generally follows the existing levee alignment to a point along 63rd Street south of Grand Avenue. Levee alignment 1 was placed landward of an existing levee along Walnut Creek in the vicinity of North Valley Drive to follow the preliminary encroachment limit which was determined.

140. Between the point along 63rd Street where the existing Walnut Creek levee ends and the Interstate 235 embankment, several alternate levee alignments were studied, as shown on plate E-18. Alignment 1-A is located along a preliminary encroachment limit which would not increase stages of the 100-year-frequency flood more than one foot. The alignment would require two road closure structures, a road ramp, and a railroad closure.

141. Alignment 1, including alignment 1-A, would protect 922 residences, 143 commercial firms, and 22 industries. Preliminary analysis indicated that for a level of protection equal to a 100-year-frequency flood annual costs would be $357,800 and annual benefits would be $647,400 resulting in a benefit to cost ratio of 1.81. Preliminary analysis indicated minimal adverse environmental impacts associated with alignment 1-A. Levee right-of-way would require taking of lands currently used for urban development except for about 22 acres of woodland. The levee alignment would

provide recreational opportunities in the form of fishing access points, bicycle paths, and parkland adjacent to the levee alignment. Stormwater ponding areas could be located on undeveloped lowlands. Borrow material could be obtained from undeveloped agricultural land within the city limits of West Des Moines. Based on the preliminary analysis levee alignment 1-A was considered for further analysis.

142. Alignment 1-B would remain on the east side of 63rd Street to upstream of Grand Avenue where the alignment would cross 63rd Street and join alignment 1-A. Alignment 1-B was not considered further. While not protecting any more development than 1-A, alternative 1-B would cost more because of an additional closure structure required at 63rd Street and a channel modification required downstream of Grand Avenue to allow construction of a floodwall between 63rd Street and the stream channel. Alignment 1-B would also increase stages of the 100-year-frequency flood more than 1 foot requiring mitigative measures for structures on the opposite bank.

143. Alignment 1-C considered raising a portion of Hoak Drive as part of the line of protection and extending the protection to the I-235 embankment. Alignment 1-C was not considered further because the additional cost of alignment 1-C is greater than the additional benefits realized by protecting two additional developments located along Center Street. Raising Hoak Drive 9 or 10 feet required for levee protection would also adversely affect entrances to three businesses located on the east side of Hoak Drive which would not be protected.

144. Alignment 1-D considered extending alignment 1-A around a ready-mix plant located south of Center Street. The elevation of the ground at the plant is above the elevation of the 100-year flood, however, and the close proximity of the plant to Hoak Drive and Center Street and the access requirements of the truck traffic make the cost of floodwall and numerous closure structures much greater than the flood reduction benefit realized. Therefore, alignment 1-D was not considered further.

145. Alignment 1-E considered protection of the three businesses on the east side of Hoak Drive in addition to the ready-mix plant and a commercial firm located along Center Street. This alignment could extend to I-235 or tie-in to alignment 1-A or 1-D. The severe encroachment along the right bank of the creek would increase 100-year flood stages in the residential area on the opposite bank more than two feet. The increase in flood stages would require that mitigative measures be considered for the residential area on the opposite bank and upstream. The estimated incremental cost of alignment 1-E, including a levee on the left bank, exceeds the estimated incremental benefits resulting in a benefit-to-cost ratio of about 0.8. Consideration was not given in the preliminary analysis to drainage facilities required for the left bank levee alignment nor to mitigative measures required for development located upstream of the I-235 bridge. Due to the economic infeasibility, alignment 1-E was not considered further.

146. A channel modification to compliment levee alignment 1-E was also considered for the reach of Walnut Creek between 63rd

Street and Center Street. The channel modification was considered to lower flood stages associated with levee alignment 1-E as a mitigative measure in lieu of providing a levee around a residential area located on the left bank of the creek. The channel and levee system is supported by property owners located along the right bank of Walnut Creek between Center Street and 63rd Street.

147. Hydraulic computations show that a 50-foot bottom-width channel between Center Street and 63rd Street with 3H to 1V side slopes in conjunction with levee alignment 1-E could result in a 100-year water surface profile equal to the existing condition profile. The increased cost of the channel modification, as compared to levee alignment 1-A, excluding additional rights-of-way and severance damages, is estimated at $180,000. The cost includes riprapping the channel because of increased velocities. The annual cost, at 5-7/8 percent interest, is about $10,400. The incremental existing flood damage reduction benefits are estimated to be $4,500 resulting in an incremental benefit-to-cost ratio for this plan of about 0.4.

148. The environmental impacts of a channel widening and straightening project for this reach of Walnut Creek would involve losing the existing aquatic environment and losing 6.4 acres or woodland. About 2.5 acres of this land lies along the left bank. The privately owned property has a natural stream setting and would be adversely affected by the channel modification.

149. Protection of properties along the east side of Hoak Drive is not economically feasible and the mitigative measures required

by such protection for the existing development on the left bank of the creek have adverse environmental and social impacts. Levee alignment 1-A is selected in the initial screening process as the most efficient tie-off plan along the right bank of Walnut Creek. Alignment 1-A is acceptable to the officials of West Des Moines and Des Moines, State of Iowa, and other Federal agencies. However, the strong support by local property owners along Hoak Drive for a plan which affords them flood protection, as stated at the late-stage public meeting, indicates that levee alignment 1-E should be reevaluated during the Phase I post-authorization studies as a variation to levee alignment 1-A.

150. Alignment 2, as shown on plate E-18, would protect seven commercial firms and four residences along the left bank of Walnut Creek in the vicinity of Grand Avenue. Three additional commercial establishments along the creek downstream of Grand Avenue could not be included in the alignment because of severe encroachment and the high incremental cost of protection compared to the incremental benefits realized. Even without protection for the three additional commercial establishments, alignment 2 was not economically feasible to implement. The cost is estimated at $910,000, excluding rights-of-way. The annual cost, at 5-7/8 percent interest, is $53,635. The annual benefits are estimated at $26,400, resulting in a benefit-to-cost ratio of 0.5. Due to the economic infeasibility, alignment 2 was not considered further.

151. Alignment 3, as shown on plate E-18, considered flood protection for an industrial park area along the right bank of

Jordan Creek and the left bank of the Raccoon River. In this area, eight industries have recently constructed buildings, three of which are subject to flooding from the Raccoon River and from Jordan Creek. The estimated cost of providing protection, excluding drainage facilities and rights-of-way, is $500,000. The annual cost at 5-7/8 percent interest is $29,470. The annual flood reduction benefit for 200-year protection is $500 resulting in a benefit-to-cost ratio of 0.02. Due to the economic infeasibility, alignment 3 was not considered further.

152. Channel and Bridge Modifications are considered when the costs of the modifications are less than the savings realized by reducing the required height of other measures, such as levees. A preliminary analysis of the water surface profiles for the Raccoon River indicated that channel modifications would not be warranted in the study area. Major channel work along the Raccoon River would have to start downstream of the mouth of Walnut Creek to reduce flood stages in the project area corresponding to large floods. The severe adverse effect on the riverine environment including Denman Woods, Brown's Woods, the Des Moines waterworks infiltration gallery system, and the potential impact on an existing sand and gravel operation would more than offset the reduction in flood heights. The two existing bridges in the study area do not cause excessive headloss during large floods.

153. A major problem area along Walnut Creek exists at the Grand Avenue bridge and the Chicago, Milwaukee, St. Paul and Pacific Railroad bridge located upstream. These bridges would cause about 3.0 feet of swellhead during a 100-year-frequency flood event.

Upstream of the railroad bridge, about 2,000 feet of the Walnut Creek channel was improved by the city of Des Moines in 1969. A new bridge across Walnut Creek at 63rd Street was constructed as part of the work.

154. To reduce the headloss through the Grand Avenue and railroad bridges, the waterway opening of each bridge would have to be enlarged and the channel downstream of Grand Avenue would have to be realigned and enlarged. This work would require relocation of three commercial firms on the left bank downstream of Grand Avenue. Hydraulic computations show that if efficient bridges are assumed resulting in 0.5 feet of headloss through the bridges for a 100-year-frequency flood, as compared to 3.0 for existing conditions, the water surface profile would return to the existing condition profile at about 63rd Street. Therefore, levee heights could be reduced between Grand Avenue and 63rd Street by bridge and channel modifications. Stage-damage relationships for the left bank area could also be improved. The estimated net savings in levee costs would be less than $100,000. The cost of widening the Grand Avenue Bridge and the railroad bridge and the associated relocations and channel modifications would exceed $1,000,000. Additional benefits gained by reducing stage-damage relationships in the left bank area at Grand Avenue would not offset the wide margin of cost between reduced levee height and bridge and channel modifications. Although the Grand Avenue and Chicago, Milwaukee, St. Paul and Pacific Railroad bridges impede flows of Walnut Creek, the cost of improving the bridges far exceeds flood damage reduction benefits gained. Therefore, these improvements were not considered further.

155. Walnut Creek channel modifications upstream of 63rd Street were considered and discussed in conjunction with alternate levee alignments in that reach.

156. Walnut Creek channel modifications downstream of Grand Avenue were also considered. Reducing flood stages would require enlarging and straightening the channel. The cost of a large channel or a combination channel and right bank levee is greater than the cost of a levee alone. Such work would have severe adverse impacts on the natural stream environment and existing and proposed recreational activities through and upstream of Denman Woods. Indications are that channel modifications in this reach would be unacceptable to local officials, and State and other Federal agencies. Therefore, this alternative plan was not considered further.

ALTERNATIVES CONSIDERED FURTHER

157. Only the levee and floodwall alternative and the no additional action plan remained for further consideration after initial screening and evaluating. A recreation plan was also considered further for the levee and floodwall plan because city officials indicated that they wished to participate.

LEVEE AND FLOODWALL ALIGNMENT 1 and 1-A.

158. Preliminary screening of various alternative plans to reduce flood damage at West Des Moines and Des Moines, Iowa, along the

Raccoon River and Walnut and Jordan Creeks indicates that a structural plan of levees and floodwalls along the left bank of Jordan Creek and the Raccoon River and along the right bank of Walnut Creek including recreation features consisting of fishing access points, bicycle paths, and a small park in West Des Moines would be an economically, environmentally, and socially acceptable solution.

159. Alignment 1 including alignment 1-A, as shown on plate E-18, along Walnut Creek would protect about 927 acres including 922 residences, 143 commercial firms, and 22 industries thereby increasing national economic development primarily through increased productivity of the land resource. Relocation of one business and two residences would be required by this plan. Table E-9 presents the economic benefits and costs for various levels of protection considered for alignment 1.

Table E-9

ECONOMIC BENEFITS AND COSTS (FLOOD CONTROL ONLY)
(Alignment 1)

Level of Protection	Annual Costs	Existing Annual Benefits	Benefit-to-Cost Ratio	Net Benefits
100 Year	$357,800	$647,400	1.81	$289,600
200 Year	385,000	717,100	1.86	332,100
SPF	476,200	779,600	1.64	303,400

160. The net benefits indicate optimum scale of development at the 200-year-frequency level of protection. However, the Standard Project Flood level of protection provides a greater degree of protection and is economically justified. It is, therefore determined to be the design level for this alternative.

161. Preliminary analysis of alignment 1 indicates that the plan has minimal adverse environmental effects. The most significant adverse environmental impact would be the loss of about 22 acres of existing woodland within the project right-of-way primarily along Walnut Creek. The balance of the alignment would require taking of lands currently used for urban development and existing levees. Storm water ponding areas requiring about 70 acres would be located in open fields currently zoned residential and industrial. Borrow material could be obtained from about 44 acres of agricultural land about 2.5 miles west of the project area shown on plate E-17. The borrow site would probably be graded and developed for residential use with or without the project. The plan would preserve significant architectural resources and would provide additional recreation opportunities by improving access and use of water and adjacent land resources along the streams involved. Alignment 1 would allow redevelopment of the downtown West Des Moines area by removing the area from flood plain status. Residents of the protected flood plain would be relieved of anxieties associated with flood damage.

162. Levee alignment 1 and 1-A would exclude certain other areas which would result in average annual flood damages as follows:

Area	Average Annual Flood Damage
Right Bank - Jordan Creek	$ 500
Right Bank - Walnut Creek 63rd Street to Center Street	6,100
Right Bank - Walnut Creek Center Street to I-235	2,500
Left Bank - Walnut Creek Center Street to I-235	1,600
Left Bank - Walnut Creek at Grand Avenue	27,000
	$ 37,700

Consideration of structural and nonstructural solutions to reduce flood damages in these areas was found to be economically infeasible.

163. Statements received at the late-stage public meeting and other correspondence indicate that the levee and floodwall plan designated as 1 and 1-A is acceptable to the local officials of West Des Moines and Des Moines, the majority of local residents, State, and other Federal agencies, and other interested groups. Correspondence received from the Iowa Conservation Commission and the company operating the sand and gravel extraction along the Raccoon River request that future planning consider realigning the levee along the Raccoon River to include the existing gravel pits for recreational potential. Consideration of these requests will depend on the determination of the Raccoon River floodway and a foundation conditions in the area.

164. Correspondence from property owners located along Hoak Drive request that future planning consider modification of the Walnut Creek tie-off alignment designated as 1-A to provide flood protection for their properties and existing structures.

NO ADDITIONAL ACTION

165. The plan described as "No Additional Action" is also considered further because it represents the existing and near future conditions in the area assuming no major structural or nonstructural measures are undertaken.

166. Under this plan for the total urban area an estimated $803,000 in existing average annual flood damages would continue to affect the communities and the Nation. Implementation of flood plain regulation would prevent additional flood damages. Flood insurance is available to existing development, however, costs of administering the program would slightly increase the cost to the Nation. The stability of the development in the flood plain area would remain in jeopardy because of the potential flood hazard and the flood plain regulations required to be adopted by the Flood Insurance Program.

167. The long-term evacuation of existing buildings within adopted floodways would have a beneficial affect on the flood plain environment but the relocation of the existing development in the floodway and the potential relocation of any development in the floodway fringe could possibly have a net adverse environmental effect because of the development of upland areas needed for the displaced businesses and homes.

168. Under the "No Additional Action" plan anxieties associated with the flood hazard would continue, as would the money and time involved in flood fighting, cleanup, and restoring flood damaged properties.

COMPARISON OF ALTERNATIVES

169. The levee and floodwall plan and the "No Additional Action" plan are each feasible to be recommended. The levee and floodwall plan can achieve the greatest contribution to national

economic development primarily through reducing flood damages thereby increasing the output of goods and services. Therefore, this plan is designated the NED (National Economic Development) Plan. The levee and floodwall plan will also enhance the environmental quality of the study area to a greater degree than the "No Additional Action" plan. This plan is therefore, also designated as the EQ (Environmental Quality) Plan.

170. Table E-10 presents a summary comparison of the two alternative plans considered further. Table E-10 presents the beneficial and adverse effects of each plan considered further in terms of national economic development, environmental quality, regional development, and social well-being.

TABLE E-10

SYSTEM OF ACCOUNTS - SUMMARY COMPARISON OF ALTERNATIVES

	Levee and Floodwall Plan NED & EQ PLAN	No Additional Action
1. Plan Data		
Structures	Levees, floodwalls, roadramps, pump stations, and interior drainage facilities.	Emergency evacuation, floodfighting, flood insurance, regulatory control of flood plain use, flood disaster relief.
Right-of-way requirements and borrow areas	186 acres total	0
2. NED (Avg Ann $1000)		
Beneficial	1,168.9	0
Adverse	495.5	1,151.8
Net	673.4	-1,151.8
3. Environmental Quality		
Aesthetic values	Loss of view and access to Walnut Creek.	Unaffected
Biological resources - Woodlands	Loss of 22 acres of creek bottom land timber along Walnut Creek.	Unaffected
Water quality	Temporary degradation during construction.	Unaffected
Air quality	Temporary degradation during construction.	Unaffected
Archaeological resources	Possible destruction of unidentified sites during construction.	Possible destruction of sites by non-public commercial or agricultural use.
4. Regional Development		
Project area	Beneficial; increase toward stability. Will provide opportunity for new development to locate in flood fringe area.	Adverse; continued flood hazard and flood plain regulations will probably halt location of new development in flood fringe area.
5. Social Well-being		
Flood risk	Reduction of hazard to life and property in protected area.	Continued hazard to life and property.
Public health	Reduction in floodwater pollution hazard in protected area.	Continued hazard to health with flooding of water plant.
Public utility facilities and services	Sewers, water, and other public utilities and services would continue during floods.	Interruption of sewer, water, and other public utilities and emergency service would occur with floods.
Community cohesion	Probable stabilization or increase in flood plain population and community ties. Possible alienation of unprotected areas.	Continued potential to decline in flood plain population and disruption of community and family ties.

TABLE E-10 (Continued)

SYSTEM OF ACCOUNTS
LEVEE AND FLOODWALL PLAN

Effects	Timing	West Des Moines-Des Moines	Rest of Nation	The Nation: A Summary			
					Income Classes		
				Totals	Residential	Industrial Commercial	Public
1. National Economic Development							
Beneficial							
Increased output (Avg Ann $1000) Urban Flood Control and Recreation	IV	1,168.9 A,b	0	1,168.9 A,b	31%	65%	4%
Transportation of Goods During Flood Periods	I	Increase	0	-	-	-	-
Effect on Productivity	III	Expected increase	0	-	-	-	-
TOTAL BENEFICIAL		1,168.9	0	1,168.9	-	-	-
Adverse							
Value of resources for project construction (Avg Ann $1000)	I	98.2	367.7 A,b	465.9 A,b	50%	50%	-
Operation, maintenance, and replacement (Avg Ann $1000)	I	29.6 A,b	0	29.6 A,b	53%	47%	-
TOTAL ADVERSE		127.7	367.7	495.5	-	-	-
2. Environmental Quality							
*Aesthetic values	I	Accessibility to and view of Walnut Creek would be reduced within the community along with a decline in open and green spaces. A,c	-	Reduction of access to and view of Walnut Creek and decline in open and green spaces. A,c			
Biological resources - Woodlands	I	Loss of 20 acres of flood plain vegetation, timber, and associated wildlife habitat. A,c	-	Loss of flood plain vegetation, timber, and habitat. A,c			
*Water quality	I	Temporary increase in pollution levels during construction activities. A,c	-	Short-term increase during construction. A,c			
*Air quality	I	Temporary increase in pollution levels during construction activities. A,c	-	Short-term increase during construction. A,c			
Archaeological resources	I	Possibility of artifacts existing in area. A,a	-	Some potential loss of artifacts possible. A,a			
*Destruction or disruption of natural resources	I	Loss of 22 acres of flood plain wildlife habitat and 41 acres of urban flood plain for rights-of-way - Disruption of 70 acres of urban flood plain for ponding areas - Loss of 44 acres of farmland for borrow area - Reduction in fuels, minerals, and forest products used for floodfighting and flood damage repairs. A,c,F	-	Loss of wildlife habitat and farmland - Reduction in floodfighting effort and damage repair. A,c,F			
*Destruction or disruption of manmade resources	III	Extended useful life of existing urban improvements.	-	Extended life of urban improvements.			
3. Regional Development							
Net benefits - Summary National Accounts (Avg Ann $1000)	III	954.7 F	-271.7 F	682.9	50%	50%	-
*Employment stability	III	Increased stability from reduction of flood hazard to industrial-commercial establishments. A,b	-	Increase in employment stability. A,b			
*Desirable community growth	III	Reversal of potential decline trend for flood plain. A,b,F	-	Reverse of potential decline in flood plain.			
*Desirable regional growth	III	Improvement resulting from increased community stability. b	-	-	-	-	-
*Local property tax revenue	II	Local short-term decrease from loss of project lands; long-term increase due to increased property values. A,b,F	-	-	-	-	-
*Property values	II	Land enhanced by project. A,b,P	-	-	-	-	-
*Business-industrial activity	II	Land enhanced by project with increased business-industrial activity. A,b,P	-	-	-	-	-
4. Social Well-Being							
Reduced flood risk	I	Reduction of flood hazard to life and property. A,c,F	-	Reduced flood hazard. A,c,F			
Public health improvement	I	Reduced pollution by protection of sewer systems and the protection of water plant, and the reduction of insect populations by eliminating standing water in low areas. A,c,P	-	Reduced pollution to river and creek from flooding and a reduction in the insect population. A,c,P			
*Displacement of people	I	Seven families displaced by the project. Project should induce stabilization.	-	-	-	-	-
*Displacement of business	I	One business displaced by project. Seven businesses vacated recently, probably due to flood hazard. Project should induce stabilization.	-	-	-	-	-
*Displacement of farms	-	None displaced by project.	-	-	-	-	-
*Effect on essential public services	I	Utilities within the community will be protected. Access for emergency service - police, fire, ambulance - will be assured. A,c,P	-	Safe water and power supply. Emergency service maintained.			
*Noise pollution	I	Higher than normal levels during construction period. A,c	-	Temporary increase during construction. A,c			
*Community cohesion	II	Anticipated increase with stability in population and commerce.	-	-	-	-	-

* Item specifically mentioned in Section 122, R & H Flood Control Act, 1970.

TABLE E-10 (Continued)

SYSTEM OF ACCOUNTS

NO ADDITIONAL ACTION PLAN

Effects	Timing 1/	West Des Moines-Des Moines	Rest of Nation	The Nation: A Summary Totals	Income Classes Residential	Industrial Commercial	Public
1. National Economic Development							
Beneficial							
Increased output Urban Flood Control (Avg Ann $1000)	IV	0	0	0	-	-	-
Transportation of Goods During Flood Periods	II	No change to present conditions.	-	-	-	-	-
Effect on Productivity	II	No change to present conditions.	-	-	-	-	-
TOTAL BENEFICIAL		0	0	0	-	-	-
Adverse						$	
Value of resources for project construction (Avg Ann $1000)	I	0	0	0	-	-	-
Operation, maintenance, and replacement (Avg Ann $1000)	I	0	0	0	-	-	-
Cost of flood damage (Avg Ann $1000)	I	1,158.6 will continue.	0	1,151.8	-	-	-
TOTAL ADVERSE		1,158.6	0	1,151.8	-	-	-
2. Environmental Quality							
*Aesthetic values	I	Remain unchanged	-	-	-	-	-
Biological resources	I	Present trends would prevail.	-	-	-	-	-
*Water quality	I	Present trends would prevail.	-	-	-	-	-
*Air quality	I	No change	-	-	-	-	-
Archaeological resources	I	Future of identified sites uncertain; depending on changes in land use patterns.	-	-	-	-	-
*Destruction or disruption of natural resources	I	No direct loss of land, but continued expenditure of resources in floodfighting and rebuilding effort.	-	Resources used in floodfighting and rebuilding effort.			
*Destruction or disruption of manmade resources	III	Reduction in useful life of existing urban improvements.	-	Continued reduction in physical life of community.			
3. Regional Development							
*Employment stability	II	Some decline could be expected in flood plain.	-	-	-	-	-
*Desirable community growth	II	Unlikely under continued existing conditions. a Some decline could be expected in flood plain.b	-	Lower rate of growth for developed areas in flood plain under existing conditions. b			
*Desirable regional growth	II	-	-	Negative effect expected. b			
*Local property tax revenue	II	Probable decline as businesses and residences exit from flood plain due to continued damage.	-	-	-	-	-
*Property values	II	Slow degradation expected as recurrent flooding pressures relocation from the flood plain.	-	-	-	-	-
*Business-industrial activity	II	No growth anticipated for available vacant areas; continued expansion of existing units. b	-	-	-	-	-
4. Social Well-Being							
Reduced flood risk	-	No reduction of flood hazard.	-	-	-	-	-
Public health improvement	I	Possible pollution of water system during major floods; large insect populations will continue during periods of flooding. c	-	Pollution and disease problems will continue during flood periods. c			
*Displacement of people	III	None other than the natural declines expected under recurring flood conditions and zoning requirements.	-	-	-	-	-
*Displacement of businesses	III	None other than the natural declines expected under recurring flood conditions and zoning requirements.	-	-	-	-	-
*Displacement of farms	-	None	-	-	-	-	-
*Noise pollution	-	No change	-	-	-	-	-
*Community cohesion	-	Gradual deterioration with declines in flood plain population, commerce, and community stability.	-	-	-	-	-
*Effect on essential public services	I	Interruption of public utility and emergency services during flood periods.	-	-	-	-	-

NOTATION:

Actual and Potential Effects

A - No Government action needed other than implementing agencies.

B - Government action needed and likely to produce beneficial effect; adverse effect can and likely will be prevented by Government action.

Uncertainty

a - 50% or more

b - 10-50%

c - less than 10%

Non-Exclusivity

F - Overlapping entry with NED; fully monetarized in NED account.

P - Overlapping entry with NED; partially monetarized in NED account.

1/ Timing

I - Construction or within a few years of construction.

II - Over project life, main impact by year 10.

III - Over project life, main impact by 10-25 years.

IV - Over project life, main impact by 25-50 years.

V - Over project life, main impact by 50 or more years.

* Item specifically mentioned in Section 122, R & H Flood Control Act, 1970

171. The structural flood protection system of levees and floodwalls and the proposed recreation plan meets the needs of the area and the criteria established for Federal recommendation and participation. Therefore, this plan is selected for recommendation.

172. The analysis of alternatives indicates that the plan selected for recommendation would make the greatest net beneficial contribution to the National Economic Development (NED) and to the Environmental Quality (EQ). The plan has net beneficial effects on the region and contributes to the social wellbeing of the communities.

PLAN DESCRIPTION

173. The plan of protection, shown on plate E-19, consists of about 5 miles of earthen levee and floodwall along Jordan Creek, the Raccoon River, and Walnut Creek. Levees have been incorporated into the design wherever possible because of the higher cost of floodwall construction. Floodwalls have been used when there is insufficient land for levee construction or existing land uses prohibit the taking of sufficient land.

PROTECTION FROM UPSTREAM OF FULLER ROAD TO CONFLUENCE OF JORDAN CREEK AND RACCOON RIVER

174. An earthen levee is proposed from high ground upstream of Fuller Road along the left bank of Jordan Creek to Fuller Road. A gated closure structure is proposed to be located at the line of protection and Fuller Road. A flood warning system is proposed for Jordan Creek watershed to allow city officials ample time to effect closure against Jordan Creek flooding.

175. An earthen levee is proposed from Fuller Road to the Chicago, Rock Island and Pacific Railroad. A gated closure structure is proposed for the railroad track. A road ramp is planned for an unpaved road immediately downstream of the railroad track. A levee is then planned for about 900 feet along the left bank of Jordan Creek to the confluence of the creek and the Raccoon River.

176. A business located downstream of the unpaved road along the left bank of the creek will have to relocate as part of plan. Protection of the business would require a gated closure structure and about 250 feet of floodwall. The cost of the closure structure and floodwall is greater than the cost of relocating the business plus the cost of a road ramp and material for levee construction. The business may be able to relocate on undeveloped land immediately east of the present location.

PROTECTION FROM CONFLUENCE OF JORDAN CREEK AND RACCOON RIVER TO WEST DES MOINES--DES MOINES CITY LIMIT (63RD STREET)

177. At about station 31+00 the earthen levee along the right bank of Jordan Creek will turn northeast for about 3,000 feet along the west side of a railroad siding. A gated closure structure will be required where the levee crosses the railroad siding. Immediately east of the railroad closure a ramp is proposed for an unpaved road.

178. An earthen levee is proposed from the road ramp for about 4,700 feet along the south side of the Chicago, Rock Island and Pacific Railroad tracks to the city limits of West Des Moines (1st Street) and Des Moines (63rd Street). A gated closure structure is proposed at the 63rd Street road crossing.

PROTECTION FROM WEST DES MOINES--DES MOINES CITY LIMIT TO NORTH VALLEY DRIVE

179. An earthen levee is proposed from the Des Moines city limit at 63rd Street some 1,300 feet to the Chicago, Rock Island and Pacific Railroad tracks. A gated closure structure is proposed across the tracks. An earthen levee is then proposed along the north side of the railroad track for about 2,000 feet to an existing levee along Walnut Creek. The existing Walnut Creek levee will be improved between about station 146+00 and station 166+00. At station 166+00 a new levee is proposed to

North Valley Drive because the existing levee encroaches on the preliminary floodway. A road ramp is proposed at station 176+00 for an existing road and at North Valley Drive.

PROTECTION FROM NORTH VALLEY DRIVE TO GRAND AVENUE

180. The existing levee along the right bank of Walnut Creek will be improved between North Valley Drive and the West Des Moines--Des Moines city limit at 63rd Street. The line of protection will cross 63rd Street at a point where the street is at the design flood elevation. A sandbag closure will be required for freeboard.

181. A low levee is proposed along the west side of 63rd Street (1st Street--West Des Moines) to an existing parking lot, where a floodwall is planned for some 300 feet to Grand Avenue.

PROTECTION FROM GRAND AVENUE TO CENTER STREET

182. A gated closure structure is proposed at Grand Avenue. A floodwall is then proposed along an existing parking lot for some 275 feet. An earthen levee is proposed between the north end of the floodwall and Ashworth Road. A gated closure structure is planned across the intersection of Ashworth Road and the Chicago, Milwaukee, St. Paul and Pacific Railroad track. A levee is then proposed around the east side of an existing building and then along the east side of Hoak Drive to station 239+60. A road ramp is proposed across Hoak Drive at this point where the levee will

follow along the west side of Hoak Drive for about 1,000 feet. A road ramp at station 239+60 will not affect entrances to businesses located on the east side of Hoak Drive which will not be protected. The levee will then turn west to the Chicago, Milwaukee, St. Paul and Pacific Railroad track. A gated closure structure is proposed at the railroad tracks. The levee alignment will tie to high ground about 175 feet west of the railroad tracks.

RECREATION FEATURES

183. Recreation features of the proposed plan include a bicycle trail and a boat ramp in Des Moines and a city park, fishermen's access, and bicycle trail in West Des Moines.

RECREATION - DES MOINES

184. Des Moines has developed bicycle trails beginning at Greenwood and Ashworth Park and continuing along the Walnut Creek and Raccoon River corridor. The city plans to expand this system to form a regional network of bicycle trails to serve users from West Des Moines, Windsor Heights, and Clive. Recreation demand for this popular outdoor activity is increasing within the region and the development of the recreational features of the proposed flood protection project will serve as a vital link in this regional network.

185. The features include a proposed bicycle trail that will begin with a ramp at a proposed boat launch entrance road at 63rd Street near station 106+50, as shown on Plate E-27. The adjacent

parking lot can serve as a gathering area for cyclists who ride as a group or to store cars while using the trails in the region for touring-type trips. The paved trail will be constructed atop the levee and continue in a northerly direction into West Des Moines. Access points to other city-proposed trails are included in the plan. Cyclists will use the signaled railroad grade crossing at 63rd Street to cross the railroad tracks and travel east on Railroad Avenue to a ramp at a closure structure at station 120+00. Scenic views in this reach are afforded by the Raccoon River and surrounding lowland forests.

186. At station 176+00 a ramp will intersect with a trail leading from North Valley Drive. At Vine Street a ramp will lead to a trail that extends to Legion Park in West Des Moines. The proposed trail will then continue atop the levee to a ramp at the 63rd Street crossing (station 204+00) and then continue along the east edge of the roadway across Grand Avenue and parallel Walnut Creek through an existing open space parkway. At the existing 63rd Street bridge, the proposed trail will pass under the roadway as it enters West Des Moines. The city of Des Moines is planning a crossing at Walnut Creek which will intersect with the proposed trail and provide a link to urban paths and bike routes northeast of the creek (Plate E-27).

187. A boat ramp, parking lot, and fishing access area is proposed to be located adjacent to the Raccoon River, east of 63rd Street as shown on Plate E-27. The access road and parking lot will have a gravel surface and the boat ramp will be concrete. The site will receive use by fishermen using the banks and sand flats bordering the river. Bottom land trees will be planted to shade users and beautify the development.

188. City Park - Station 90+00. This park would be developed in conjunction with construction of the levee, ponding area, and storm water pumping station. Existing private properties will be purchased by the city and be developed as a public park. The park will be designed and developed as a low density open space park. An access road, parking lot, and outdoor furniture will be located in the park. Landscaping and grading will create a natural setting for leisure pastime. Vehicle and bike access will be from the east end parallelling the railroad tracks. A walkway, steps, or ramp will be constructed as access to the adjacent gravel pits for fishermen's use.

189. Bicycle Trail. The north end of the project located in West Des Moines will provide a link for regional trail plans as discussed earlier. Continuing from the 63rd Street bridge, the trail would ramp to the levee and proceed northwest to near the end of the project along Hoak Drive and ramp down to existing ground elevation. The trail would be constructed to the same standards as the portion of the trail proposed in Des Moines.

EVALUATED ACCOMPLISHMENTS

190. Basic accomplishments that this plan achieves include flood protection, recreational development, and preservation of historic and archaeological resources.

- The plan provides flood damage reduction in an economically efficient manner.

- It provides for the development of recreation facilities along the Raccoon River, Walnut Creek, and Jordan Creek.

- The social acceptability of the plan is established. Established social patterns existing within the flood plain will be maintained and the adverse effects associated with flooding will be eliminated within the protected area.

- The identified historic and archaeological resources within the flood plain will be protected from flooding.

- Assimilation of this plan into the development of the flood plain management measurements currently under consideration by the communities is plausible. The plan has been formulated within the preliminary encroachment limits and flood flow criteria established by local interests and the State of Iowa.

- This study and the associated coordination has encouraged local interests to seek flood plain management measures to eliminate flooding problems.

191. The information generated by this study and report will be helpful to the local interests primarily in establishing flood plain regulations. Residual needs include flood damage reduction measures for areas excluded from protection, and the future wise use of the flood plain. Flood damages within the protected area could result from overtopping of the proposed protection system by flood flows greater than the design Standard Project Flood discharge. Flood flows greater than the Standard Project Flood would be extremely rare, however.

PLAN EFFECTS

192. Both direct and indirect and adverse and beneficial effects will result from the selected plan.

ENVIRONMENTAL EFFECTS

DIRECT ENVIRONMENTAL IMPACTS

193. Geology-Soils. Except for the 44 acres of borrow material, the project will not directly affect the geological or soil resources within the project area.

194. Physiography. No significant alterations to the physiography of the area are anticipated. The physical levee structure will produce a visual contour change from the relatively flat, level flood plain that presently exists.

195. Climate. No basic climatic changes are expected as a result of the proposed project.

196. Hydrology. Neither construction of the levee and floodwall nor the borrow area will significantly effect the existing hydrologic and hydraulic characteristics of Walnut Creek, Jordan Creek, and the Raccoon River. No significant increases in frequency or duration of flood flows is expected. Increases in flood profiles for the affected streams are shown for existing and proposed project conditions in table E-11. The proposed project condition

profiles are based on the levee project along one bank and existing conditions along the opposite bank for the Raccoon River, Walnut Creek, and Jordan Creek. Comparative water surface elevations are shown in table E-11.

Table E-11

WATER SURFACE PROFILES - EXISTING AND PROPOSED PROJECT CONDITIONS

RACCOON RIVER		Water Surface Elevations for Existing Conditions		Water Surface Elevations Proposed Project Conditions	
Cross Section	Description	100 Year Frequency	SPF	100 Year Frequency	SPF
1		806.9	810.5	806.9	810.5
2		807.4	811.6	807.4	811.6
3		808.1	812.7	808.1	812.7
4		808.6	813.9	808.6	813.9
5	DS RR Bridge 1/	809.6	814.8	809.6	814.8
6	US RR Bridge 2/	810.5	817.5	810.5	817.5
7	DS 63rd Street	815.3	820.2	815.3	820.9
8	US 63rd Street	816.2	821.2	816.2	821.9
9		818.2	823.4	818.2	823.9
10		818.5	824.1	818.5	824.4

WALNUT CREEK		Water Surface Elevations for Existing Conditions		Water Surface Elevations Proposed Project Conditions	
Station	Description	100 Year Frequency	SPF	100 Year Frequency	SPF
9+75	DS C.R.I.&P. RR	808.5	813.0	808.5	813.0
9+75	US C.R.I.&P. RR	811.5	814.8	811.5	814.8
18+00		811.6	814.9	811.6	814.9
26+00		811.6	814.9	811.6	814.9
35+00		811.6	814.9	811.7	815.0
44+00		811.7	815.0	811.8	815.1
54+00		811.8	815.1	812.2	815.4
64+00	DS Valley Dr	812.1	815.3	812.8	815.9
64+00	US Valley Dr	812.3	815.5	813.1	816.2
68+00		812.5	815.6	813.4	816.4
73+00		812.8	815.8	813.9	816.8
78+00		813.2	816.0	814.3	817.1
83+00		813.7	816.5	814.7	817.4
88+00		814.3	816.9	815.2	817.7
98+00	DS Grand Ave	816.2	818.0	816.5	818.7
101+00	US C.M.St.P.&P. RR	819.2	820.5	819.4	821.3
105+50		819.7	821.1	820.1	822.0
118+00	DS 63rd Street	820.5	822.2	820.8	823.0
118+00	US 63rd Street	821.1	823.2	821.6	824.4
121+00		821.1	823.2	821.6	824.4
134+00		822.4	824.7	822.8	825.6
140+00		823.5	825.8	823.9	826.8
142+00	DS Center Street	824.8	827.0	825.6	828.4
142+00	US Center Street	824.9	827.1	825.9	828.7
148+00		825.4	827.6	826.2	828.9
154+50	DS I-235	826.0	828.1	826.6	829.4
154+50	US I-235	826.1	828.6	826.8	829.8

1/ DS - Downstream
2/ US - Upstream

Table E-11 (Cont'd)

JORDAN CREEK		Water Surface Elevations for Existing Conditions		Water Surface Elevations Proposed Project Conditions	
Station	Description	100 Year Frequency 7,900 cfs	SPF	100 Year Frequency	SPF
1+00		818.5	824.5	818.5	824.5
2+00		819.0	824.5	820.1	825.3
10+00	DS C.R.I.&P. RR 1/	820.3	824.5	821.3	826.5
10+00	US C.R.I.&P. RR 2/	824.2	825.9	824.2	827.0
20+50		827.9	828.8	829.6	830.5
24+40		831.0	832.5	831.3	834.4
26+50	DS Fuller Road	831.4	832.8	831.7	834.9
26+50	US Fuller Road	832.6	834.5	832.6	835.4

1/ DS - Downstream
2/ US - Upstream

197. The borrow area is located on high agricultural land, within the watershed of Jordan Creek. See plate E-17. It will be operated, graded, and seeded to control erosion with the drainage pattern essentially unchanged.

198. Water Quality. Levee construction will result in soil erosion, with short-term impacts upon the aquatic community - principally in Walnut Creek. The levee site along Raccoon River is too far removed from the stream to produce this effect. This impact is expected to be of short duration and no significant changes in the existing water quality is expected as a result of the project.

199. Biological Elements. Construction of the new levee and floodwall and upgrading of the existing levee will destroy approximately 22 acres of existing vegetation and wildlife habitat along the immediate alignment. Most of the damage will occur along the Walnut Creek sector of the levee and particularly along the northeast perimeter of Denman Woods. Development of the levee may also interfer with some existing wildlife movements and travel laps within the project area.

200. The proposed ponding areas have very limited value botanically or as wildlife habitat. They lack woody cover and the limited herbaceous cover is relatively unproductive for wildlife. A relatively stable ecosystem within the ponding area is not anticipated because of the periodic, cyclic conditions of being wet and dry.

201. Approximately 44 acres of present agricultural land will be lost by use of the borrow area. The future use of this area, which is within the city limits of West Des Moines, is unknown and therefore the significance of this impact is difficult to evaluate.

202. A temporary adverse impact on the aquatic communities along Walnut Creek is expected. Increased siltation and turbidity caused by erosion from construction activities will likely occur. This will be a short-term, localized problem and should not significantly affect the future aquatic resources within the project area.

203. Additional problems associated with air and noise pollution can be anticipated during the construction period. The contractor will be responsible for complying with all Federal, State, and local standards regarding these problems.

204. Aesthetics. Most of the property bordering the levees are either commercial, industrial, railroad, or street right-of-way. The Raccoon River and Walnut Creek are largely inaccessible for public viewing or enjoyment throughout most of the area. The levee alignment along Walnut Creek offers a good view of that stream from North Valley Drive to Grand Avenue. This levee segment has a well defined trail and is heavily used by hikers, bicyclists, and other outdoor recreationists. The natural corridor provided by the existing levee will be further extended with the new levee segments. The levees will provide an overview of the two streams, and

ultimately of the pit lake which will be developed on the Martin Marietta property.

205. Since there are virtually no residences with a view to the river the levee will not interrupt existing riverview. Railroad grade or natural screening has cut off the view of those few homes which might otherwise overlook the Raccoon River.

206. The appearance of the areas where proposed ponding area 2 and part of ponding area 3 are to be located will change from existing conditions. The relatively bare ground will be transformed into open water. Ponding areas 1, 4, and the east part of ponding area 3 pond storm water under existing conditions. Any aesthetic change will be largely in the eye of the beholder. Outdoor sports and other recreational uses which are expected to concentrate in all of the ponding areas during dry periods will generally involve younger people at play. This is usually considered aesthetically pleasing and must be considered a beneficial effect.

207. The aesthetic appearance of the borrow area will probably be relatively neutral. It will be shaped and seeded until such time the future use of the area is determined.

208. Seeding of the levee should help enhance the appearance of the levee as well as provide erosion control. Landscaping and beautification will provide screening of project features and will help break the straight line contour of the levee. Plantings will partially offset losses to existing vegetation and wildlife habitat.

209. With the assurance of flood protection, increased urbanization and development of the flood plain can be anticipated. Benefits attributed to such development would include possible increased employment, increased tax base and enhancement of the area and regional economy.

210. Expanded recreational facilities in addition to project recreation facilities are expected to include permanent type developments such as swimming pools, tennis courts, park and picnic areas, and similar facilities no longer postponed for fear of floods.

211. Increased development would also involve additional losses of existing vegetation and habitat, and open space. Increased levels of noise, water, and air pollution, as well as increased demands for various urban services can be expected.

OTHER EFFECTS

TRANSPORTATION AND PUBLIC FACILITIES

212. With the exception of possible temporary interruption of local traffic during construction activities, the project will not alter transportation systems or facilities. Flood protection for such facilities will mean uninterrupted access and services that would benefit both local and regional economy. Protection of such facilities would also mean less maintenance costs and work for cleanup and repairs that normally occur after periods of flooding.

ECONOMY OF THE AREA

213. Tangible benefits of this project consist of protection against flood damage to industrial, commercial, residential, agricultural, and public property. Intangible benefits include increased safety, welfare, social stability, and economic stability to the residents and employees of the area. A detailed description of the economics of the selected plan is presented in Section F of this report.

214. With the project, existing and new developments in the West Des Moines-Des Moines project area can be expected to grow at the present rate which is about 2 percent compounded annually. Without the project, the location of new businesses in the flood plain would probably slow considerably because of the restrictions in the Flood Disaster Protection Act of 1973 and various Iowa regulations on development of areas subject to inundation by 100-year frequency flooding. Under provisions of the Flood Disaster Protection Act, which goes into effect 1 July 1975, land use controls will be required in areas subject to inundation by the 100-year flood to purchase flood insurance. New structures under such controls will be required to be flood proofed to the 100-year level. If communities or individuals choose not to take advantage of the program, Federal grants or financing from federally supervised lending institutions will not be available for public or private improvements.

RECREATION

215. Alignment of the Raccoon River segment of levee is so far removed from the river, or physically separated from it by railroad

tracks, that in most sectors it will have little or no effect upon recreationists' use of the river. At only one point - 63rd Street and Railroad Avenue vicinity - does the planned levee alignment come within 500 feet of the river. In this area a levee crossing will be built to furnish ingress and egress to the river. Access to the Raccoon River is somewhat limited. Levee operation and maintenance programs are expected to accommodate recreational needs and make the levee available to city recreational planning groups for improved access to both Raccoon River and Walnut Creek.

216. Through coordination with the local sponsors, facilities for bicycling, hiking and walking, picnicking, nature study, and bird watching have been included in the project. These facilities will generate recreation use and participation within the levee corridor.

217. With the proposed availability of a 200-acre pit lake, the Raccoon River levee segment contiguous to the lake site becomes a potential key element in the ultimate outdoor recreational plan for this area. However, the pit lakes will not be available for another 15 years, therefore, no specific development plans have been made. It is expected that Martin Marietta Corportation, the city of West Des Moines, and the Iowa Conservation Commission will coordinate their interests with regard to future development of this area.

218. The ponding areas will function as dry weather recreational sites. Natural drainage or pumping will quickly dry them out following their use for storm water storage. City planners will determine those outdoor recreational uses for these areas which will be compatible with their primary function of storm water storage.

HISTORICAL AND ARCHAEOLOGICAL

219. Based on the survey conducted by Environmental Research Center, there are no known archaeological, historical, or architectural sites that will be adversely affected by the project including the ponding and borrow areas. Coordination will be maintained with the State Historic Preservation Officer if additional sites are discovered during the actual construction period.

220. Ten architectural sites included or recommended for inclusion in the Iowa Inventory of Historic Places will be protected from flooding by the planned levee. These sites are all in West Des Moines and are centered about two blocks north of Railroad Avenue on or near 5th Street, as shown on plate E-1.

221. The only historic site in the project vicinity is the Jordan House, located on the north side of Fuller Road near South 19th Street (see plate E-1). This site is listed on the National Register of Historic Places. The site will not be affected by the project nor will it be protected from flooding.

DESIGN

DESIGN FLOOD

222. The design level of protection will prevent flooding against a Standard Project Flood event on the Raccoon River, Walnut Creek, and Jordan Creek. Such a flood would be a rare occurrence, but could occur in any year. The design flood discharge for each stream is:

Stream	Standard Project Flood Discharge in c.f.s.
Raccoon River	143,000
Walnut Creek	27,500
Jordan Creek	16,000

LEVEE DESIGN

223. Levees will consist of semi-compacted clay with a crown width of 10 feet. Sideslopes will be 1V on 3H. The levee slopes and crown will be seeded. About 5 inches of material will be stripped along the levee alignment and inspection trench will be excavated to locate objectionable material and possible sources of serious underseepage such as abandoned pipes. Some existing foundation information is available as a result of some 52 borings taken as shown on Plate E-19. The total length of new levee embankment is about 4.3 miles and the length of improved levee planned is about 0.4 mile. The maximum height is about 24 feet along the Raccoon River. The average is about 14 feet for the entire project.

BORROW

224. About 966,000 cubic yards of clay borrow will be required to construct the proposed project. About 78,000 cubic yards can be obtained from ponding area 4 and 65,000 cubic yards can be obtained from ponding area 2. The remaining 823,000 cubic yards will be obtained from 44 acres of land located in the southwest quarter of

section 8 and the northwest quarter of section 17, township 78 north, range 25 west. The borrow site is within the West Des Moines city limits about 2.5 miles west of the project, as shown on plate E-17. The borrow site is currently used for crop production.

FLOODWALL DESIGN

225. Two types of floodwall are planned along the west side of 63rd Street in West Des Moines in the vicinity of Grand Avenue. About 110 feet of 3 feet high precast concrete floodwall is proposed between station 207+70 and station 208+80. The height of protection is less than 3 feet in this reach allowing the use of the precast wall.

226. About 215 feet of I-type concrete floodwall as shown on Plate E-20, is planned between the upstream end of the precast wall and Grand Avenue. The wall is required to preserve parking spaces and vehicle access to an existing commercial firm.

227. About 275 feet of I-type concrete floodwall about 9.0 feet high is also planned along the west side of 1st Street upstream of Grand Avenue to preserve parking spaces and vehicle access to commercial establishments located immediately west of the flood protection alignment.

CLOSURE STRUCTURES

228. Eight closures are planned to cross 3 streets and 5 railroad tracks. The closure structure for roads and railroads will be of basically the same design. These will be permanently mounted swinging gates with abutments and sills of reinforced concrete. The sills will be placed over and integrated with subsurface walls of steel sheet piling. For wider openings, the gates will consist of two leaves. Estimated dimensions of closure structures are presented in the following table. Their location is shown on Plate E-19.

Table E-12

CLOSURE STRUCTURES

Station	Location	Width (feet)	Height Above Ground (feet)
2+00	Fuller Road	38	8.8
19+50	Chicago, Rock Island and Pacific Railroad	38	10.9
60+00	Chicago, Rock Island and Pacific Railroad	24	10.3
106+50	63rd Street	38	7.9
120+00	Chicago and Northwestern and Chicago, Rock Island and Pacific Railroad	38	7.3
211+20	Grand Avenue	60	8.7
218+20	Ashworth Road and Chicago, Milwaukee, St. Paul and Pacific Railroad	50	7.3
253+50	Chicago, Milwaukee, St. Paul and Pacific Railroad	24	8.4

ROAD RAISES AND RAMPS

229. The plan includes raising four streets. The location of the raises are shown on Plate E-19. An unpaved road at about station 20+12 will be ramped to design levee grade. Another unpaved road will be ramped to design levee grade at about station 60+45. North Vally Drive will be ramped to design levee grade about station 176+00. Hoak Road will be ramped to design levee grade at station 239+60.

FREEBOARD

230. Three feet of freeboard will be provided along the majority of the line of protection to protect against wave action and turbulent effects of large floods. Four feet of freeboard will be provided along the upstream reaches of Walnut Creek and Jordan Creek where the greatest threat of inundation to the entire flood plain exists from levee failure. The approximate reaches of various freeboard limits is shown in table E-13.

Table E-13

FREEBOARD DESIGN

Station		Station	Height of Freeboard (feet)
0+00	to	60+00	4
60+00	to	76+50	Transition 4 to 3
76+50	to	218+20	3
218+20	to	225+00	Transition 3 to 4
225+00	to	254+40	4

FLOOD WARNING SYSTEMS

231. The selected plan includes installation of automatic flood warning systems for Walnut Creek and Jordan Creek to allow adequate time for city officials to effect closure. Both streams are subject to flash flooding, so that installation of the warning systems will be needed to maintain integrity of the project. The proposed system will include remote automatic systems with a centrally located receiver control panel.

INTERIOR DRAINAGE

232. Under existing conditions interior drainage from the eastern one third of West Des Moines empties into Walnut Creek, and the remaining runoff empties into the Raccoon River. Most runoff is conveyed through existing levees and embankments by a series of storm sewers and outlets. The only pumping presently available is by portable pumps.

233. During interior drainage studies, the existing drainage facilities were evaluated against the following criteria:

* For gravity drainage conditions - conveyance of a 50-year frequency design storm (Class II urban criteria), and;

* For blocked gravity conditions - conveyance or storage of a storm equal in frequency to one-half the river closure elevation duration percentage (Class II urban criteria) or a 1-year frequency storm, whichever is greater.

234. Where the existing gravity drainage system meets this criteria the existing drainage outlet structures will be gated and lengthened as necessary. Where the existing system has been found inadequate, appropriately sized new structures will be provided.

235. The protected areas is divided into 7 separate drainage areas as shown on Plate E-22, and each is described below.

AREA 1

236. Area 1 is a 105-acre area tributary to Walnut Creek in the vicinity of the upstream tie-back levee. The area, composed of residential, commercial, and industrial developments, is designated as Class II. Drainage from the area is presently collected and discharged through a 48-inch R.C.P. storm sewer, which discharges to Walnut Creek at station 271+00. The existing 48-inch storm sewer will be adequate for gravity conditions to discharge interior drainage from Area 1. Existing secondary ponding areas landward of the proposed line of protection will pond runoff in excess of the capacity of the storm sewer under gravity conditions. Under blocked gravity conditions, sufficient secondary ponding exists to store the runoff of the 1-year storm (1.4 inches of runoff). This secondary ponding area is located between the Chicago, Milwaukee, St. Paul and Pacific Railroad tracks and Hoak Drive. Duration of closure in this area would be very small and duration of flooding would be less then two days. For these reasons, portable pumping only is provided.

AREA 2

237. This 170-acre area is tributary to Walnut Creek. The development in the area warrants a Class II designation. At present, there is a low area in the business district along Grand Avenue which is serviced by three 36-inch storm sewers. In this problem area, water often ponds in the streets and low areas. The proposed plan calls for gating these three 36-inch storm sewers and connecting them together with a 24-inch interceptor sewer landward of the proposed floodwall. A 70 c.f.s. pump station will be placed at the center storm sewer and will be used to pump from the storm sewers during blocked gravity conditions. For gravity conditions, 9.4 acre feet of existing secondary ponding will be required to temporarily store the 50-year storm runoff in excess of sewer capacity. For blocked gravity conditions 9.4 acre feet of secondary ponding will also be required in conjunction with the 70 c.f.s. pump plant. Pump plant justification is presented under the section entitled Pump Plant Optimization.

AREAS 3 AND 4

238. Area 3 consists of 110 acres. The area is primarily residential and is designated Class II. Interior runoff is discharged into Walnut Creek through one major storm sewer and two small culverts. The drainage plan for Area 3 is to utilize the existing storm sewer and divert excess runoff and blocked gravity runoff to the ponding area located in Area 4.

239. Area 4 contains 110 acres and is also designated Class II. The proposed plan for Area 4 involves diverting all runoff into a 16-acre ponding area excavated to elevation 799.8 located at the

end of Maple Avenue. A 48-inch outlet will be provided at that location. Ponding will be limited to elevation 803.8 m.s.l. providing a maximum of 74 acre feet of storage. Under blocked gravity conditions, this ponding area will collect all runoff from Areas 3 and 4, requiring 26 acre feet of storage for the 1-year event. For gravity conditions the excess runoff which cannot be conveyed through the existing storm sewer system in Area 3 will be diverted to the ponding area along with all the surface runoff from Area 4. As a result, the full 74 acre feet of ponding would be utilized for conveyance of the 50-year storm's surface runoff. Since the ponding area is large enough to handle 3 consecutive 1-year events, portable pumps will be used during blocked gravity conditions. Seepage is not considered a problem in this area.

AREA 5

240. This area of 858 acres comprises the major portion of West Des Moines. The development within the area is residential and commercial and is designated as Class II. All surface runoff from Area 5 is presently discharged to the Raccoon River through two storm sewer systems. An 84-inch sewer discharges at 8th Street and a 48-inch sewer discharges at 5th Street. Direct overland flow to the river is presently blocked by the Chicago and Northwestern Railroad embankment.

241. The interior drainage plan for Area 5 is to excavate a 14-acre ponding area between the proposed line of protection and the Chicago and Northwestern Railroad and install twin 48-inch C.M.P.'s at 9th Street. Inflow to the ponding area will be through the existing 8th and 5th Street storm sewers. An 8-foot by 6-foot R.C.B. culvert

will be required through 4th Street to direct surface runoff from the existing outlets to the proposed gravity outlet.

242. The blocked gravity analysis for Area 5 shows that an average pumping capacity of 46,500 g.p.m. is required. The proposed sump level for pump activation is 803.5, which is equalled or exceeded by the Raccoon River 2 percent of the time. A one-year frequency 96-hour rainfall event routed through the proposed 14-acre ponding area requires an average pumping rate of 45,000 g.p.m. to limit ponding to the selected maximum elevation of 808.0. An average seepage rate of 1,500 g.p.m. increases the required average pumping rate to 46,500 g.p.m. Pump plant justification is presented under the section entitled Pump Plant Optimization.

AREA 6

243. Area 6 is an area of 918 acres, which is known as Fairmeadows Creek drainage basin. The development in this area is designated as Class II, is residential, commercial, and industrial. Surface runoff from the basin presently flows in a southeasterly direction toward the Raccoon River through a complex drainage system. The system consists of a 31-acre detention storage area with an ungated 8-foot by 6-foot R.C.B. culvert and a 36-inch R.C.P. outlet; a concrete trapezoidal channel between the detention pond and the Chicago, Rock Island and Pacific Railroad; a twin 5.5-foot by 6-foot R.C.B. culvert through the railroad embankment and a twin 72-inch R.C.P. culvert through a local road located riverward of the railroad. The detention pond and channel were constructed by a cement producing company to eliminate flooding resulting from intense rainfall over the basin. The proposed plan for this area is to provide a

gated closure for the 36-inch R.C.P. outlet of the existing ponding area, and use it to store the 1-year blocked gravity event. For gravity conditions, four 5-foot by 7-foot R.C.B. would be placed through the line of protection under the assumption that all runoff from the 50-year storm would be able to reach that point. A 12,500 g.p.m. pumping station would be placed at the line of protection to pump blocked gravity storage. The ponding area would have to be excavated an average of 1.5 feet to elevation 813.7, with material used to raise the perimeter of the ponding area to elevation 818.7 allowing for 155 acre feet of storage. For blocked gravity conditions, the 1-year event would require 107 acre feet of storage. The pump plant was sized to evacuate this amount of storage over a 2-day period. Pump plant justification is presented under the section entitled Pump Plant Optimization.

AREA 7

244. Area 7 consists of 155 acres. The major part of the area lies in the Jordan Creek flood plain, which is a tributary creek to the Raccoon River. Several new commercial and industrial firms have located in this area recently. The area has been designated Class II. Drainage from the area is presently overland to the Raccoon River. The proposed plan for this area is to excavate a 10-acre ponding area south of the Chicago, Rock Island and Pacific Railroad tracks. The ponding area would be excavated to elevation 805.7 m.s.l. allowing for 50 acre feet of storage at elevation 810.7 m.s.l. Blocked gravity conditions would require 18 acre feet of storage for the one-year event. Portable pumps would be required during blocked gravity conditions since the ponding area has the capacity to retain two consecutive 1-year events. Twin 48-inch R.C.P. outlets were sized so that

ponding would not exceed elevation 810.7 under 50-year gravity design conditions.

PUMP PLANT OPTIMIZATION

245. Three permanent pump plants have been recommended for this project--a 70 c.f.s. pump plant for Area 2, 104 c.f.s. pump for Area 5, and a 28 c.f.s. pump plant for Area 6. The need for and size of each pump plant and ponding area was determined using the following procedure. Various frequency storm runoffs were routed through the ponding areas using a variety of pump sizes. Maximum elevations reached were noted for each routing and the corresponding damage was determined. Using this information, an annual damage figure was calculated for the various size pump plants used. From this analysis, the average annual damages prevented was determined and noted as average annual benefits. Pump plant costs were projected over the project life using an interest rate of 5-7/8%. Operation cost was added to obtain the average annual costs of each pump plant. Using these average annual costs and average annual benefits, a benefit-to-cost ratio was calculated for each size pump plant. In all cases, the B/C ratio was well below 1.0.

246. Elevation-damage relationships for the various drainage areas were presented as plates E-23, E-24, and E-25. Tables E-14, E-15, and E-16 show the results of the pump plant optimization calculations.

247. Area 2. As shown in the optimization table (table E-14), the one-year storm under blocked gravity conditions would cause $360,000 in damages with no pumping, reaching an elevation of

TABLE E-14

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SUMMARY OF MAXIMUM PONDING ELEVATIONS FOR VARIOUS STORM FREQUENCIES
WITH VARIOUS PUMP SIZES AND THE TOTAL AVERAGE ANNUAL COST FOR
                       EACH ALTERNATIVE
```

DRAINAGE AREA 2

```
                              WEST DES MOINES



 STORM
FREQUENCY           PUMP SIZE IN THOUSANDS OF GALLONS PER MINUTE
               0      22     30     36     45     54     63     72     80     90


 10.00     817.5  817.0  816.9  816.8  816.7  816.5  816.2  815.9  815.7  815.5
  5.00     817.2  816.8  816.7  816.5  816.2  815.9  815.7  815.4  815.3  815.0
  2.00     817.0  816.6  816.3  816.1  815.8  815.5  815.3  815.1  815.0  814.8
  1.00     816.8  815.9  815.6  815.5  815.2  815.0  814.8  814.3  813.5  812.7

TOTAL AVG. ANNUAL
 COST*       7.0   18.7   22.0   24.4   27.5   30.5   33.3   35.7   39.1   42.1

AVERAGE ANNUAL
DAMAGE       7.0    5.4    4.8    4.4    3.7    3.1    2.6    2.1    1.6    1.2
AVERAGE ANNUAL
BENEFIT      0.     1.6    2.2    2.7    3.3    3.9    4.5    5.0    5.4    5.8
AVERAGE ANNUAL
PUMP CST     0.    13.2   17.2   20.0   23.8   27.4   30.7   33.7   37.6   40.9
BENEFIT/COST
RATIO        0.    .121   .127   .133   .140   .143   .145   .147   .145   .142


*THE TOTAL AVERAGE ANNUAL COST IS IN THOUSANDS OF
  DOLLARS AND IS THE SUM OF THE AVERAGE ANNUAL COST OF
  THE PUMPING FACILITIES AND THE AVERAGE ANNUAL COST
  DUE TO DAMAGES RESULTING FROM PONDING.
 STOP
SRU'S:2.1
!
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TABLE E-15

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SUMMARY OF MAXIMUM PONDING ELEVATIONS FOR VARIOUS STORM FREQUENCIES
WITH VARIOUS PUMP SIZES AND THE TOTAL AVERAGE ANNUAL COST FOR
                      EACH ALTERNATIVE
```

DRAINAGE AREA 5

```
                          WEST DES MOINES


 STORM
FREQUENCY           PUMP SIZE IN THOUSANDS OF GALLONS PER MINUTE
               0    22    30    36    45    54    63    72    80    90


 25.00      810.0 809.9 809.8 809.8 809.7 809.7 809.7 809.6 809.6 809.6
 10.00      809.6 809.5 809.4 809.4 809.4 809.3 809.3 809.3 809.2 809.2
  2.00      809.3 809.2 809.1 809.1 809.1 809.1 809.0 809.0 808.9 808.5
  1.00      808.7 807.5 807.2 806.9 806.6 806.2 806.0 805.7 805.5 805.2

TOTAL AVG. ANNUAL
 COST*           .5  13.6  17.5  20.4  24.1  27.7  31.0  33.9  37.8  41.0

AVERAGE ANNUAL
DAMAGE           .5    .4    .4    .3    .3    .3    .3    .2    .2    .2
AVERAGE ANNUAL
BENEFIT          0.    .1    .2    .2    .2    .2    .3    .3    .3    .3
AVERAGE ANNUAL
PUMP CST         0.  13.2  17.2  20.0  23.8  27.4  30.7  33.7  37.6  40.9
BENEFIT/COST
RATIO            0.  .010  .009  .009  .009  .008  .008  .008  .008  .008

*THE TOTAL AVERAGE ANNUAL COST IS IN THOUSANDS OF
  DOLLARS AND IS THE SUM OF THE AVERAGE ANNUAL COST OF
  THE PUMPING FACILITIES AND THE AVERAGE ANNUAL COST
  DUE TO DAMAGES RESULTING FROM PONDING.
 STOP
SRU'S:2.6
!
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TABLE E-16

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SUMMARY OF MAXIMUM PONDING ELEVATIONS FOR VARIOUS STORM FREQUENCIES
WITH VARIOUS PUMP SIZES AND THE TOTAL AVERAGE ANNUAL COST FOR
                   EACH ALTERNATIVE
```

DRAINAGE AREA 6

```
                          WEST DES MOINES


 STORM
FREQUENCY            PUMP SIZE IN THOUSANDS OF GALLONS PER MINUTE
                 0      22     30     36     45     54     63     72     80     90


 25.00        0.    821.3  821.0  820.8  820.5  820.2  819.9  819.6  819.4  819.1
 10.00     821.0  819.9  819.6  819.4  819.1  818.8  818.5  818.3  818.1  817.8
  5.00     819.8  818.7  818.4  818.2  817.9  817.7  817.4  817.2  817.1  816.9
  2.00     818.4  817.5  817.3  817.2  816.9  816.7  816.6  816.5  816.3  816.2
  1.00     817.1  816.5  816.4  816.3  816.1  816.0  815.9  815.7  815.6  815.3

TOTAL AVG. ANNUAL
 COST*        6.7   94.6  121.9  140.9  165.4  188.1  208.0  224.9  251.9  270.8

AVERAGE ANNUAL
DAMAGE        6.7    5.0    4.5    4.1    3.6    3.2    2.8    2.4    2.1    1.8
AVERAGE ANNUAL
BENEFIT       0.     1.7    2.2    2.6    3.1    3.5    3.9    4.3    4.6    4.9
AVERAGE ANNUAL
PUMP CST      0.    89.6  117.5  136.7  161.7  185.0  205.3  222.6  249.8  269.0
BENEFIT/COST
RATIO         0.    .019   .019   .019   .019   .019   .019   .019   .018   .018


*THE TOTAL AVERAGE ANNUAL COST IS IN THOUSANDS OF
  DOLLARS AND IS THE SUM OF THE AVERAGE ANNUAL COST OF
  THE PUMPING FACILITIES AND THE AVERAGE ANNUAL COST
  DUE TO DAMAGES RESULTING FROM PONDING.
 STOP
SRU'S:3.0
!
```

816.8 m.s.l. With the recommended 70 c.f.s. pump plant, damages would be reduce to $165,000, reaching an elevation of 815.5 m.s.l. To eliminate damages completely for this event, a pumping plant in excess of 200 c.f.s. would be required. Because of the natural low area in the business district along Grand Avenue and the inability to provide for a permanent ponding area, secondary ponding was provided along Grand Avenue. For gravity conditions, 9.4 acre feet of secondary storage would be required to pass the storm surface runoff. Therefore, secondary storage for blocked gravity conditions was limited to 9.4 acre-feet by use of a 70 c.f.s. pumping station. For this drainage area, the present time of closure is less than 1% with a duration of from 2 to 3 days. For the one-year storm runoff, it would take 3.4 hours to completely draw down the secondary ponding area using the recommended 70 c.f.s. pumping plant.

248. Area 5. From the optimization table (table E-14), damages for the one-year storm under blocked gravity conditions with no pumping would be $17,000. There would be no damages for the same event using the recommended 46,500 g.p.m. pump plant. Inflow to ponding area 3 is limited to a 84-inch and a 48-inch storm sewer through the Chicago and North Western Railroad embankment. The pumping plant was sized to limit runoff from the one-year storm from exceeding the capacity of the ponding area taking into consideration seepage. The ponding area size is restricted by the development in the area; therefore increasing the ponding area size to store the interior surface runoff for the one-year blocked gravity event would be infeasible.

249. Area 6. As mentioned previously, ponding area 1 is large enough to store the interior surface runoff for the one-year blocked gravity storm. Pumping is provided to evacuate this event within 48 hours. There would be no significant reduction in damages as a result of this pumping plant for any single large flood event because of the large size of the drainage area as compared to the relatively small size of the pumping plant. However, closure elevation is quite high (813 m.s.l.), which is much less than .1% duration. For blocked gravity conditions, the best defense would be to keep a dry ponding area.

HISTORIC EVENTS

250. Historic events were studied with regards to ponding areas discharging into the Raccoon River. The Raccoon River is the only gaged strem for which historic data is available. Floods of record for the Raccoon River are presented below in order of magnitude:

Date	Peak Flow at Van Meter, IA (c.f.s.)
1947	41,200
1973	35,600
1917	35,200
1958	35,200
1960	32,300
1926	32,000

251. Each event was studied as if the levee project were in operation at the time. Because streamflow records exist only for the Raccoon River, only drainage areas 5, 6, and 7 were studied. Also, the 1917 flood was not studied because sufficient data is not available.

252. Daily flows at the Van Meter gage were adjusted for West Des Moines and periods of closure were determined using the rating curve for the Raccoon River at West Des Moines (plate E-26). Hourly precipitation was determined for each period of closure using the recording gage at the Des Moines Airport. Runoff from these rainfall events were estimated and routed through each ponding area with and without the pumping plants recommended in this report. Ponding stages were determined and damages, using present conditions, were estimated. The results of this study are shown as table E-17.

OTHER INTERIOR DRAINAGE STUDIES

253. A recent report was prepared for the city of West Des Moines by the consulting firm of Vecnstra and Kimm. This report, entitled "Storm Drainage Study 1975, West Des Moines, Iowa," dated 28 April 1975 studies and recommends improvement to the existing city storm sewers. The report considers the proposed local flood protection presented in this report and makes some recommendation concerning pump plant sizes. These recommendations will be studied further during post authorization studies.

RECREATION

254. Plate E-27 shows the recreation plan. The proposed bicycle trail would be constructed with an 8-foot wide asphalt surface. Maximum grades on the trail would be below 4 percent except on ramps adjacent to the levee.

Table E-17

Historic Storm Data -- Damages

Date	Drainage Area No.	No. of Days of Closure	During Time of Closure: Total Rainfall (in.)	During Time of Closure: Rainfall Excess (in.)	Storage Required: Without Pumping (Acre Feet)	Storage Required: With Pumping (Acre Feet)	Max Elev Reached: Without Pumping	Max Elev Reached: With Pumping	Damages: Without Pumping ($)	Damages: With Pumping ($)
1973	5	8	5.93	4.33	329.0	124	810.1	809.2	84,800	28,600
	6	0	0	0	0	0	-	-	0	0
	7	8	5.93	4.33	55.9	-	811.2	-	0	-
1960	5	7	.45	.08	5.72	5.72	803.7	803.5	0	0
	6	0	0	0	0	0	-	-	0	0
	7	7	.45	.08	1.03	-	805.8	-	0	-
1958	5	4	3.93	2.99	214.0	129.2	809.6	809.2	45,800	28,600
	6	0	0	0	0	0	-	-	0	-
	7	4	3.93	2.99	38.6	-	809.6	-	0	-
1947	5	7	6.2	4.15	297.0	159.0	810.0	809.3	63,150	32,900
	6	1	0	0	0	0	-	-	0	0
	7	7	6.2	4.15	53.6	-	811.0	-	0	-
1926	5	5	2.81	2.11	150.0	48.7	809.3	806.8	32,900	0
	6	0	0	-	0	0	-	-	0	0
	7	5	2.81	2.11	27.0	-	808.4	-	0	-

255. The parking lot which would serve the boat ramp would be gravel surfaced. The boat ramp would be concrete, 12 feet wide and placed on about a 12 percent slope. Parking barriers and wheel stops would be constructed from concrete or treated wood.

256. The park would be designed and built for picnicking and be furnished with wood tables and benches. The road and parking lot would be surfaced with gravel and the site would be landscaped with trees and shrubs. Concrete steps would be constructed over the levee to a fishermen's pier at the shore of the gravel pit.

CONSTRUCTION

257. Assuming authorization and availability of funds, it is estimated that 2 years would be required for construction, following engineering and design analysis. This time estimate assumes that no problems or delays would occur in obtaining materials or equipment.

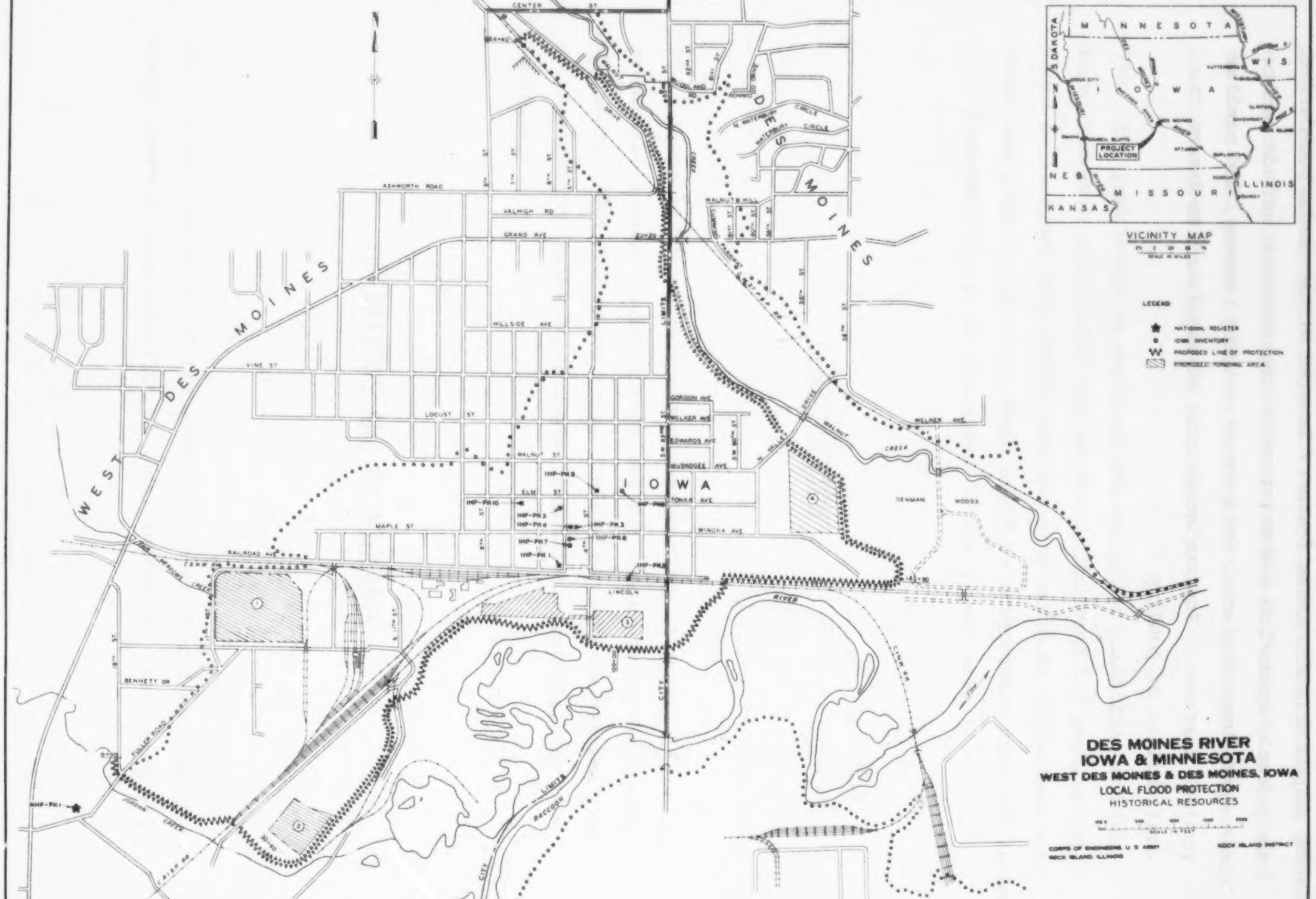
OPERATIONS AND MAINTENANCE

258. After completion of the project, operation and maintenance would become a responsibility of local interests. Each city will

be responsible for those features located within their boundaries. In general, operation and maintenance requirements include maintenance of pumping plants, drainage structures, levees, and similar project features. Ponding areas must be regulated to insure the availability of ponding.

CORPS OF ENGINEERS

U. S. ARMY



DES MOINES RIVER
IOWA & MINNESOTA
WEST DES MOINES & DES MOINES, IOWA
LOCAL FLOOD PROTECTION
HISTORICAL RESOURCES
SCALE IN FEET
CORPS OF ENGINEERS U. S. ARMY
ROCK ISLAND, ILLINOIS
ROCK ISLAND DISTRICT
VICINITY MAP
SCALE IN MILES
MINNESOTA
S DAKOTA
WIS
IOWA
NEB
MISSOURI
ILLINOIS
KANSAS
PROJECT LOCATION
LEGEND
NATIONAL REGISTER
IOWA INVENTORY
PROPOSED LINE OF PROTECTION
PROPOSED PONDING AREA
WEST DES MOINES
DES MOINES
IOWA
CENTER ST
ASHWORTH ROAD
VALHIGH RD
GRAND AVE
HILLSIDE AVE
VINE ST
LOCUST ST
WALNUT ST
ELM ST
MAPLE ST
RAILROAD AVE
BENNETT DR
FULLER ROAD
JORDAN CREEK
WALNUT CREEK
WALNUT HILL
N WATERBURY CIRCLE
WATERBURY CIRCLE
GORDON AVE
WELKER AVE
EDWARDS AVE
MUSKOGEE AVE
TONKA AVE
WINONA AVE
WELKER AVE
DENMAN WOODS
LINCOLN
RIVER
RACCOON
CITY LIMITS
C&NW RR
IHP-PK1
IHP-PK3
IHP-PK4
IHP-PK5
IHP-PK6
IHP-PK7
IHP-PK8
IHP-PK9
IHP-PK10

PLATE E-1

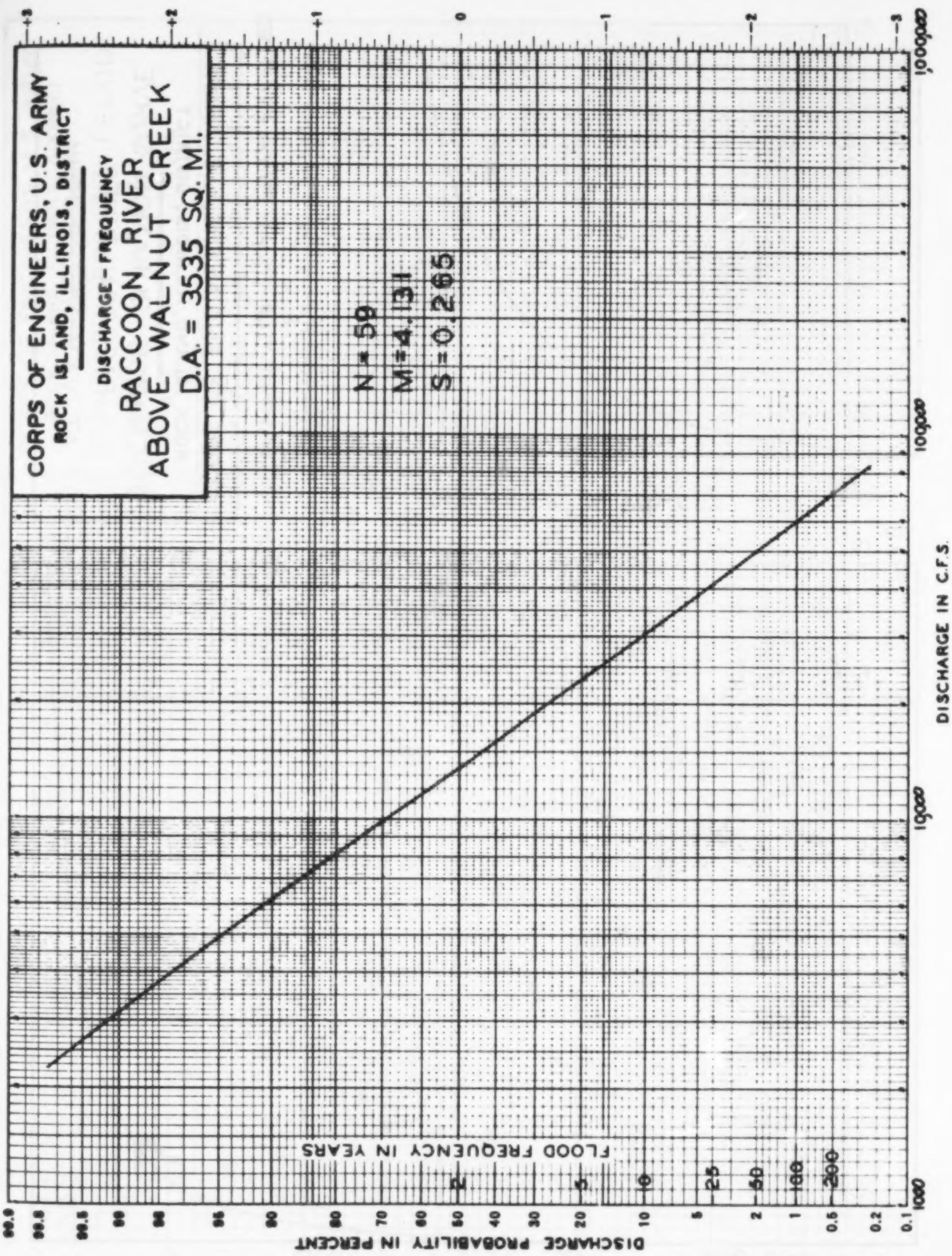
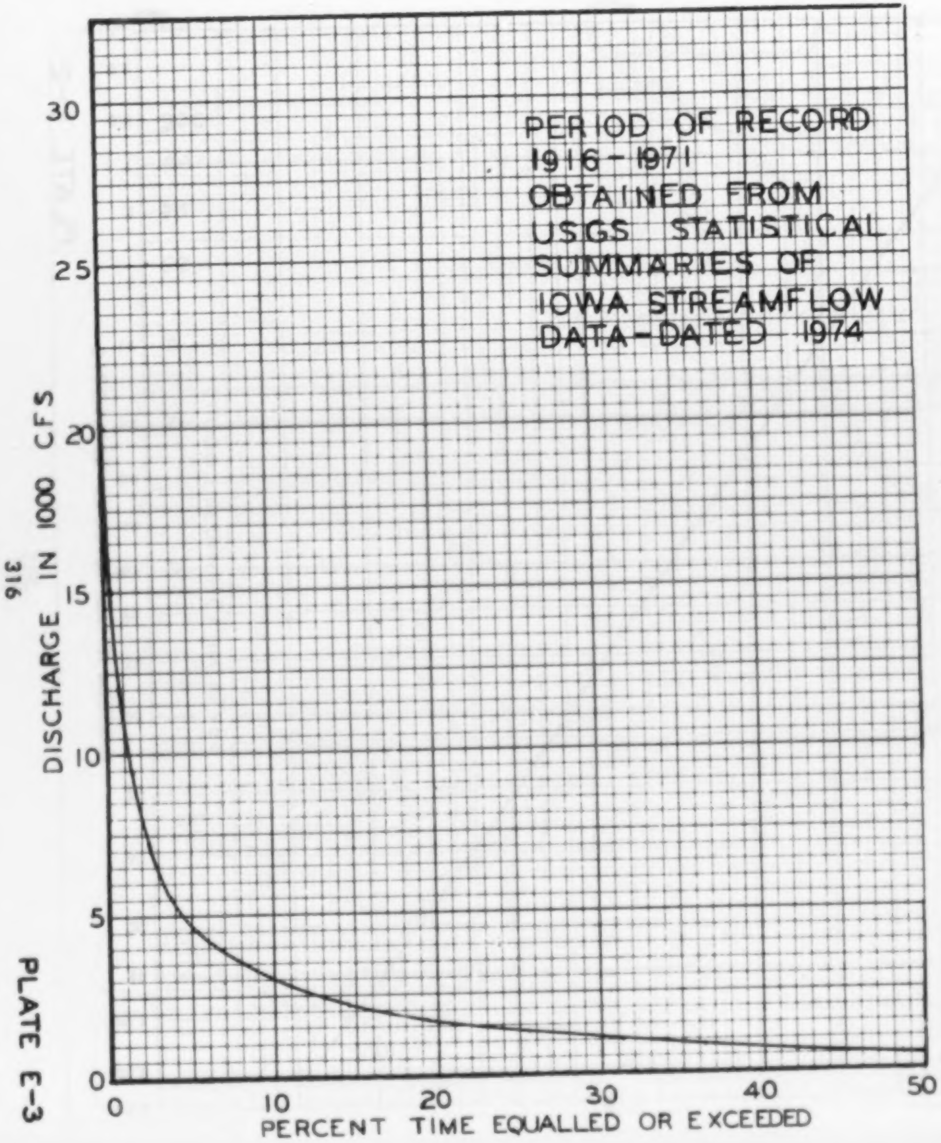
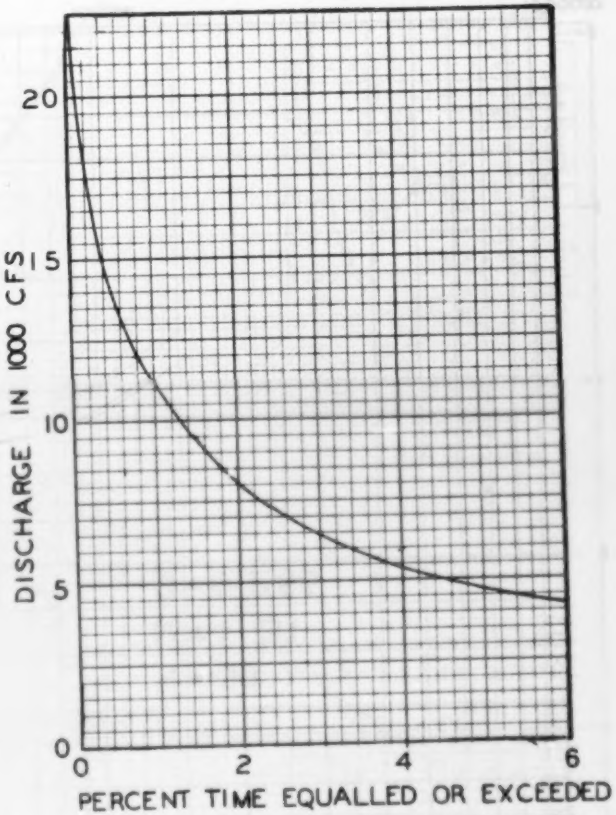

CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT
DISCHARGE - FREQUENCY
RACCOON RIVER
ABOVE WALNUT CREEK
D.A. = 3535 SQ. MI.
N = 59
M = 4.131
S = 0.265
DISCHARGE IN C.F.S.
1000
10,000
100,000
1,000,000
DISCHARGE PROBABILITY IN PERCENT
99.9
99.8
99.5
99
98
95
90
80
70
60
50
40
30
20
10
5
2
1
0.5
0.2
0.1
FLOOD FREQUENCY IN YEARS
2
5
10
25
50
100
200
+3
+2
+1
0
-1
-2
-3

PLATE E-2



PERIOD OF RECORD
1916 - 1971
OBTAINED FROM
USGS STATISTICAL
SUMMARIES OF
IOWA STREAMFLOW
DATA-DATED 1974



CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT

DISCHARGE DURATION CURVE
RACCOON RIVER
AT VAN METER, IOWA

PLATE E-3

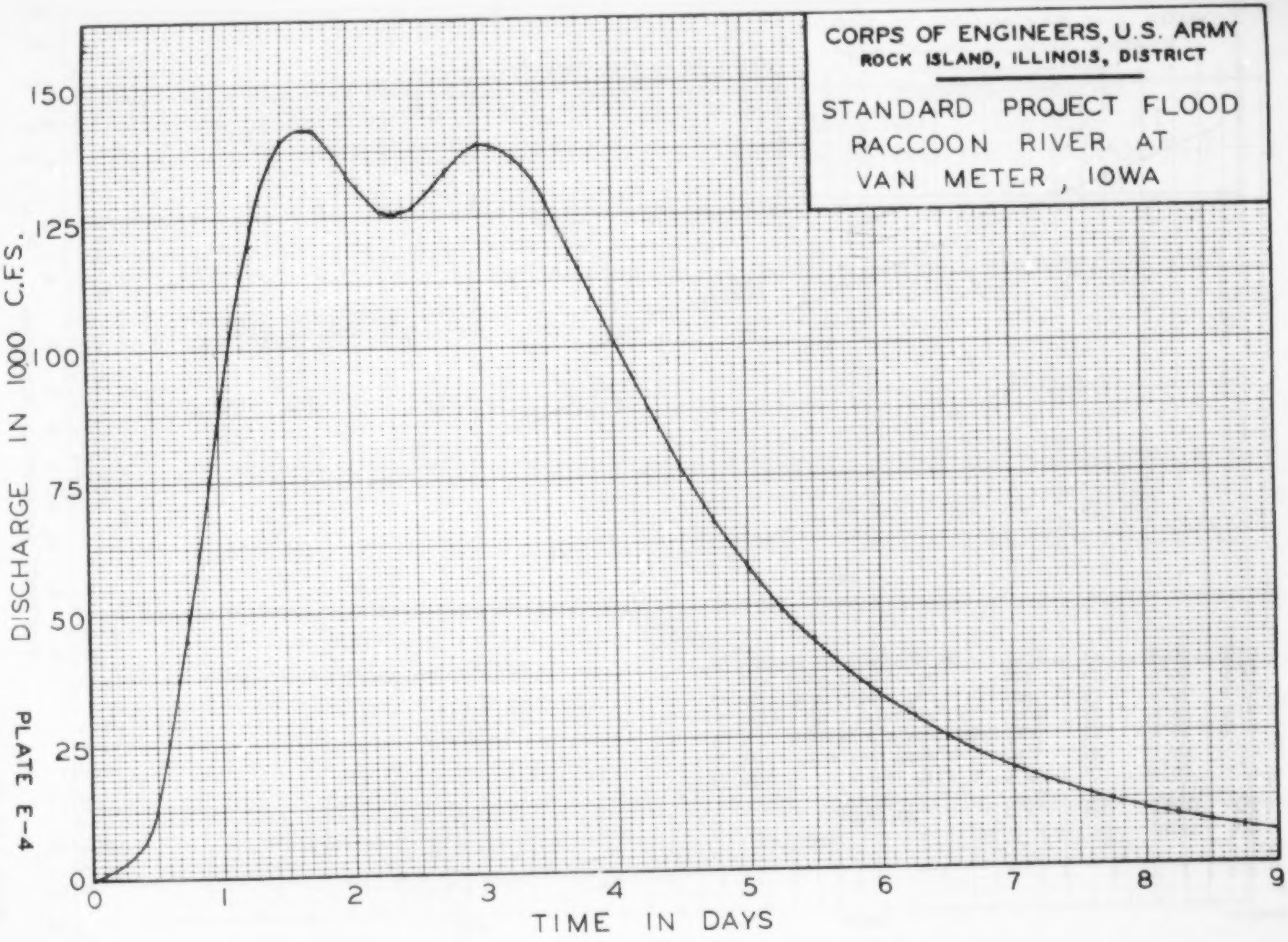
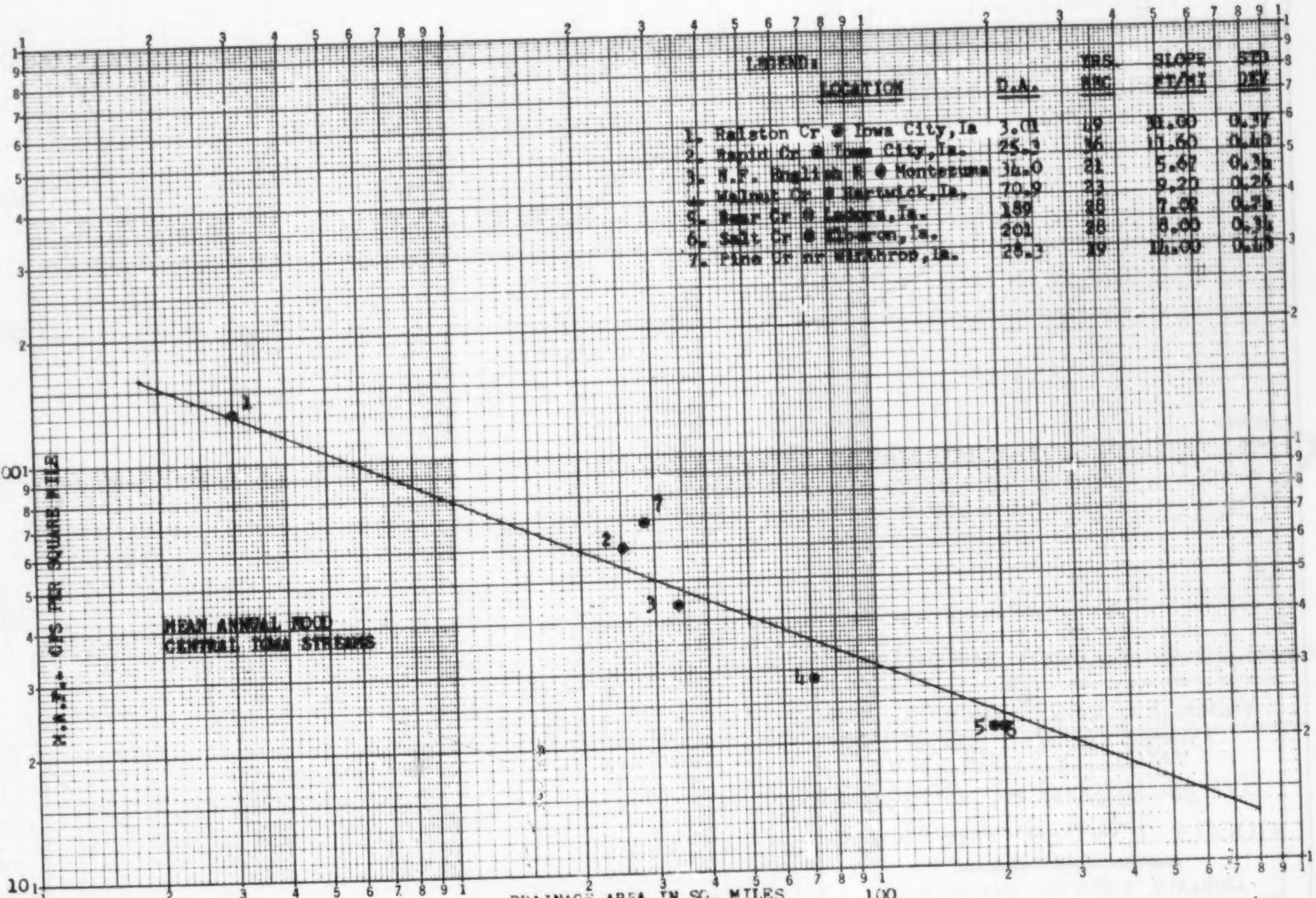

CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT
STANDARD PROJECT FLOOD
RACCOON RIVER AT
VAN METER, IOWA
DISCHARGE IN 1000 C.F.S.
150
125
100
75
50
25
0
0
1
2
3
4
5
6
7
8
9
TIME IN DAYS

PLATE E-4



LEGEND:

	LOCATION	D.A.	YRS. REC	SLOPE FT/MI	STD DEV
1.	Ralston Cr @ Iowa City, Ia	3.01	19	31.00	0.37
2.	Rapid Cr @ Iowa City, Ia.	25.3	36	11.60	0.40
3.	N.F. English R @ Montezuma	34.0	21	5.67	0.34
4.	Walnut Cr @ Hartwick, Ia.	70.9	23	9.20	0.26
5.	Bear Cr @ Ladora, Ia.	189	28	7.02	0.24
6.	Salt Cr @ Elberon, Ia.	201	28	8.00	0.34
7.	Pine Cr nr Winthrop, Ia.	28.3	19	14.00	0.40

PLATE E-5

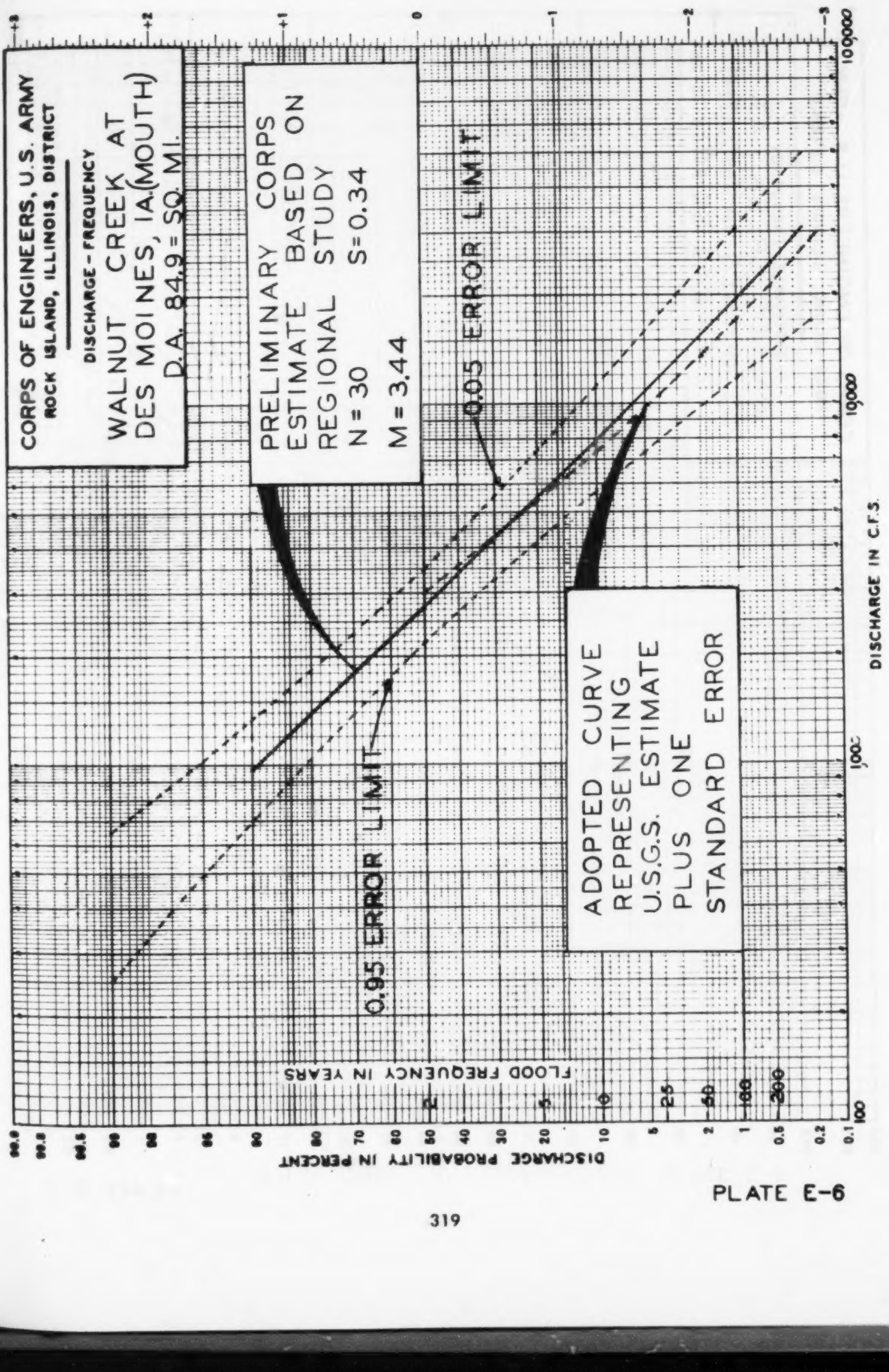

CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT
DISCHARGE - FREQUENCY
WALNUT CREEK AT
DES MOINES, IA.(MOUTH)
D.A. 84.9 = SQ. MI.
PRELIMINARY CORPS
ESTIMATE BASED ON
REGIONAL STUDY
N = 30 S = 0.34
M = 3.44
0.05 ERROR LIMIT
0.95 ERROR LIMIT
ADOPTED CURVE
REPRESENTING
U.S.G.S. ESTIMATE
PLUS ONE
STANDARD ERROR
FLOOD FREQUENCY IN YEARS
DISCHARGE PROBABILITY IN PERCENT
DISCHARGE IN C.F.S.
100
1000
10000
100000
+3
+2
+1
0
-1
-2
-3
99.9
99.8
99.5
99
98
95
90
80
70
60
50
40
30
20
10
5
2
1
0.5
0.2
0.1
2
5
10
25
50
100
200

PLATE E-6

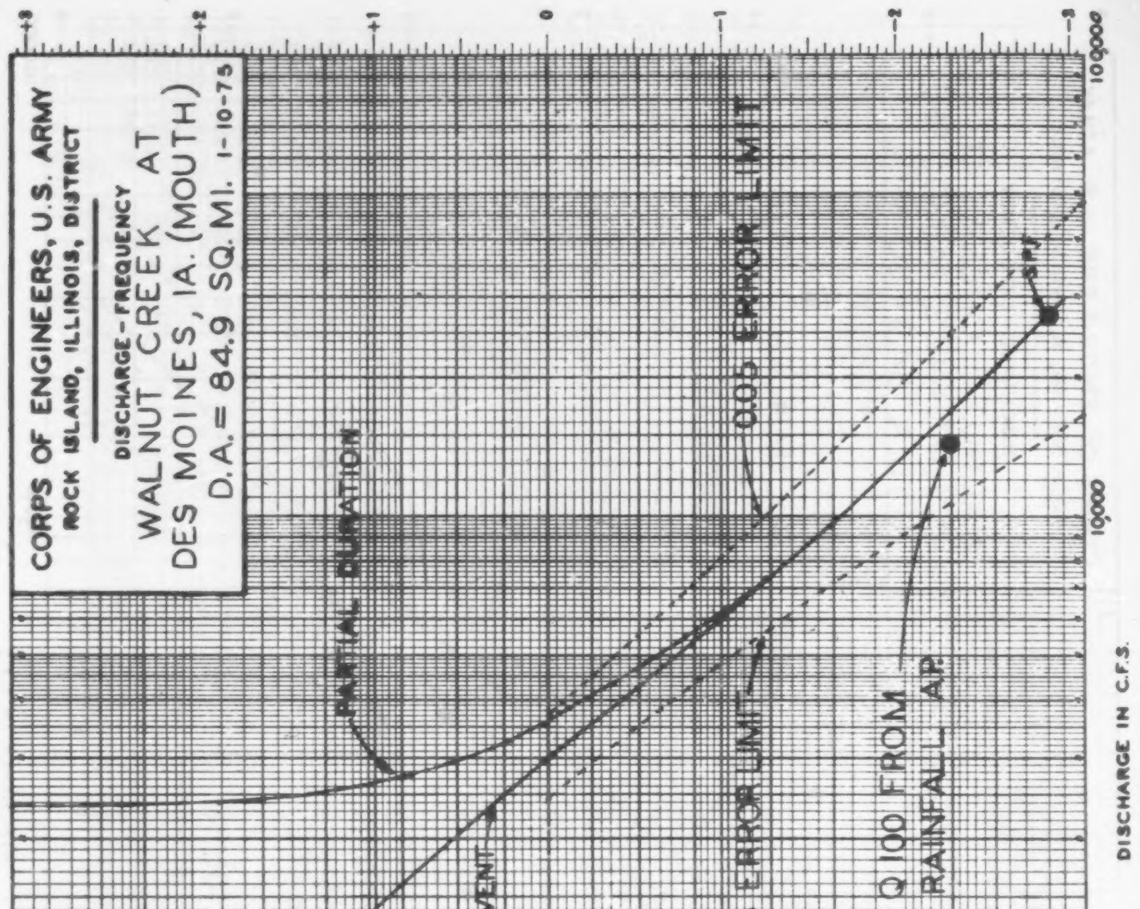

CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT
DISCHARGE - FREQUENCY
WALNUT CREEK AT
DES MOINES, IA. (MOUTH)
D.A. = 84.9 SQ. MI. 1-10-75
PARTIAL DURATION
ANNUAL EVENT
0.05 ERROR LIMIT
0.95 ERROR LIMIT
Q 100 FROM
RAINFALL AP
SPF
FLOOD FREQUENCY IN YEARS
2
5
10
25
50
100
200
DISCHARGE PROBABILITY IN PERCENT
99.9
99.8
99.5
99
98
95
90
80
70
60
50
40
30
20
10
5
2
1
0.5
0.2
0.1
DISCHARGE IN C.F.S.
100
1000
10000
100000
+3
+2
+1
0
-1
-2
-3

PLATE E-7

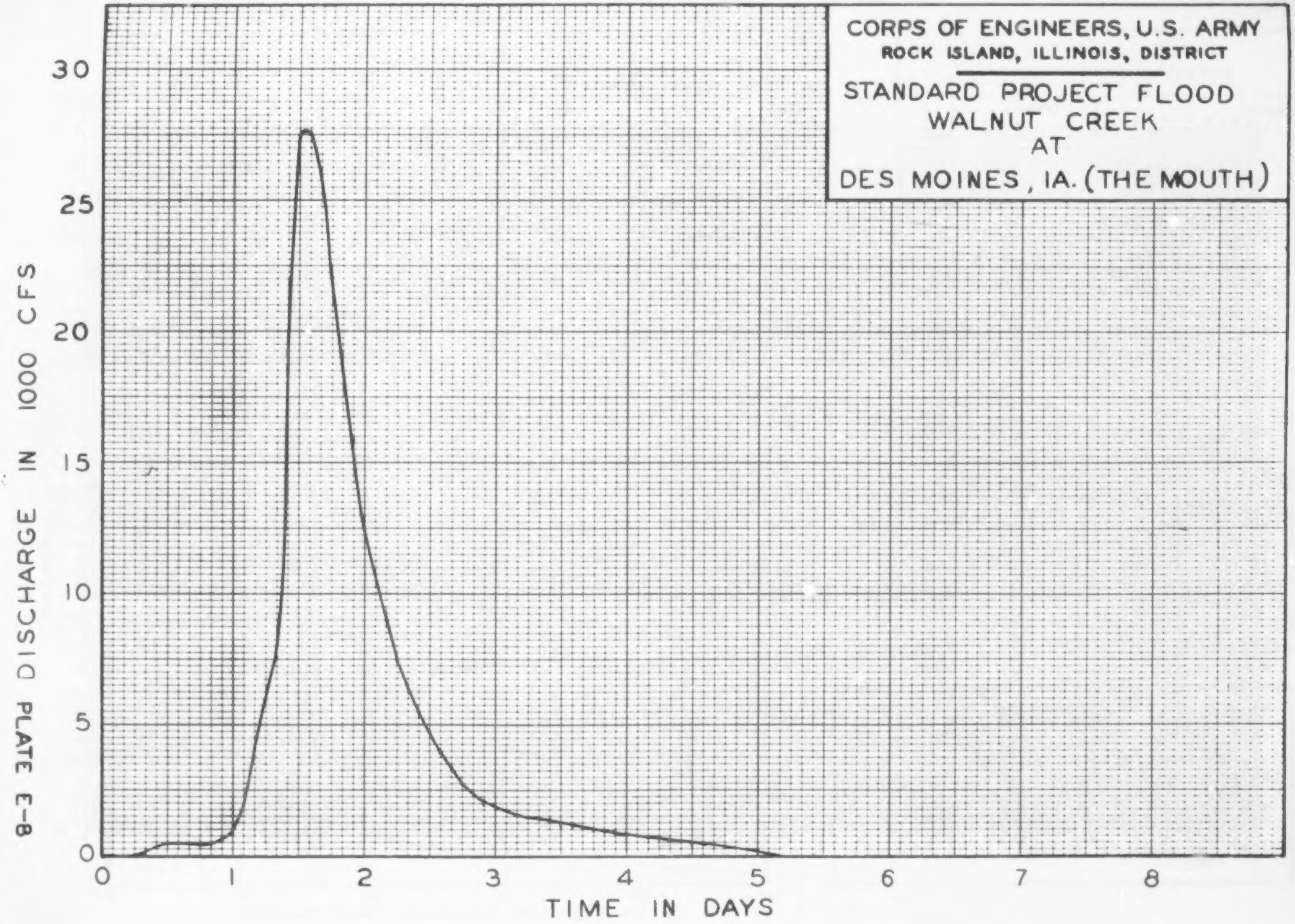

CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT
STANDARD PROJECT FLOOD
WALNUT CREEK
AT
DES MOINES, IA. (THE MOUTH)
30
25
20
15
10
5
0
DISCHARGE IN 1000 CFS
0
1
2
3
4
5
6
7
8
TIME IN DAYS

PLATE E-8

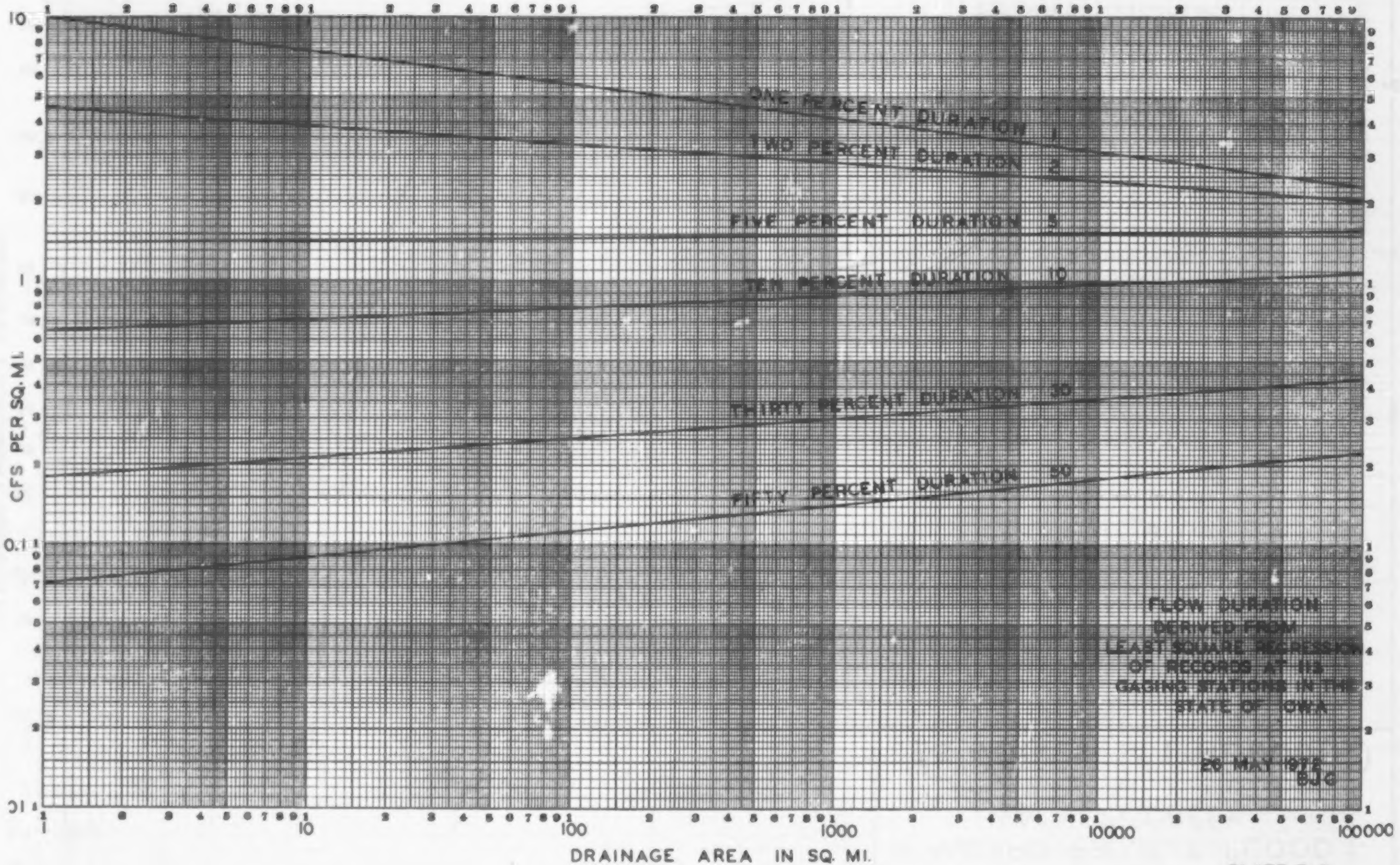
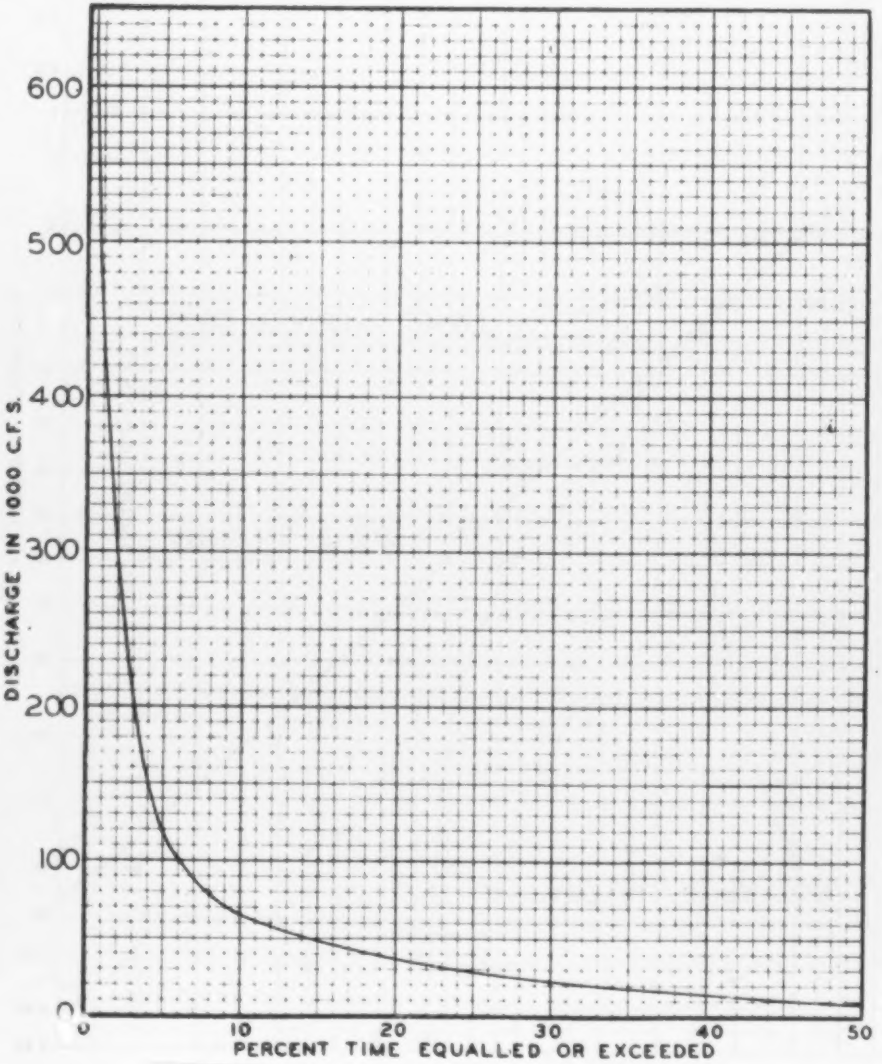
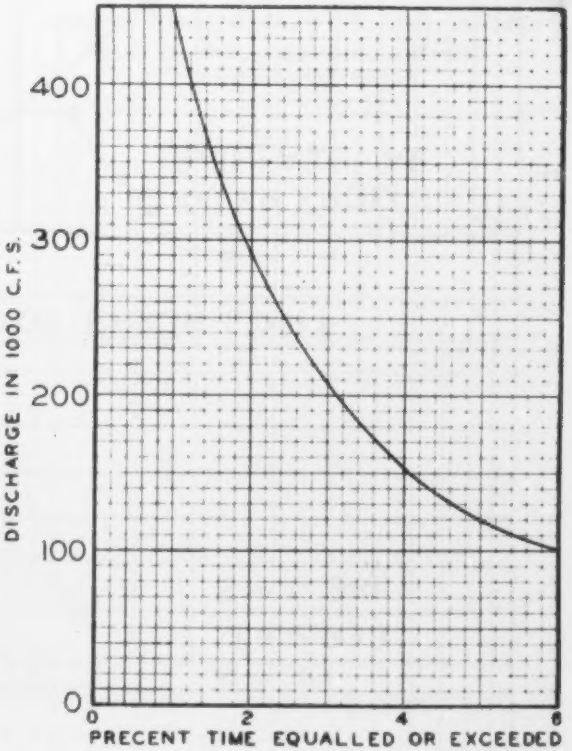

ONE PERCENT DURATION 1
TWO PERCENT DURATION 2
FIVE PERCENT DURATION 5
TEN PERCENT DURATION 10
THIRTY PERCENT DURATION 30
FIFTY PERCENT DURATION 50
CFS PER SQ. MI.
10
1
0.1
.01
DRAINAGE AREA IN SQ. MI.
1
10
100
1000
10000
100000
FLOW DURATION
DERIVED FROM
LEAST SQUARE REGRESSION
OF RECORDS AT 113
GAGING STATIONS IN THE
STATE OF IOWA
26 MAY 1978
BJC

PLATE E-9





CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT

DISCHARGE DURATION CURVE
WALNUT CREEK AT MOUTH
DRAINAGE AREA = 84.9 SQ.MI.

PLATE E-10

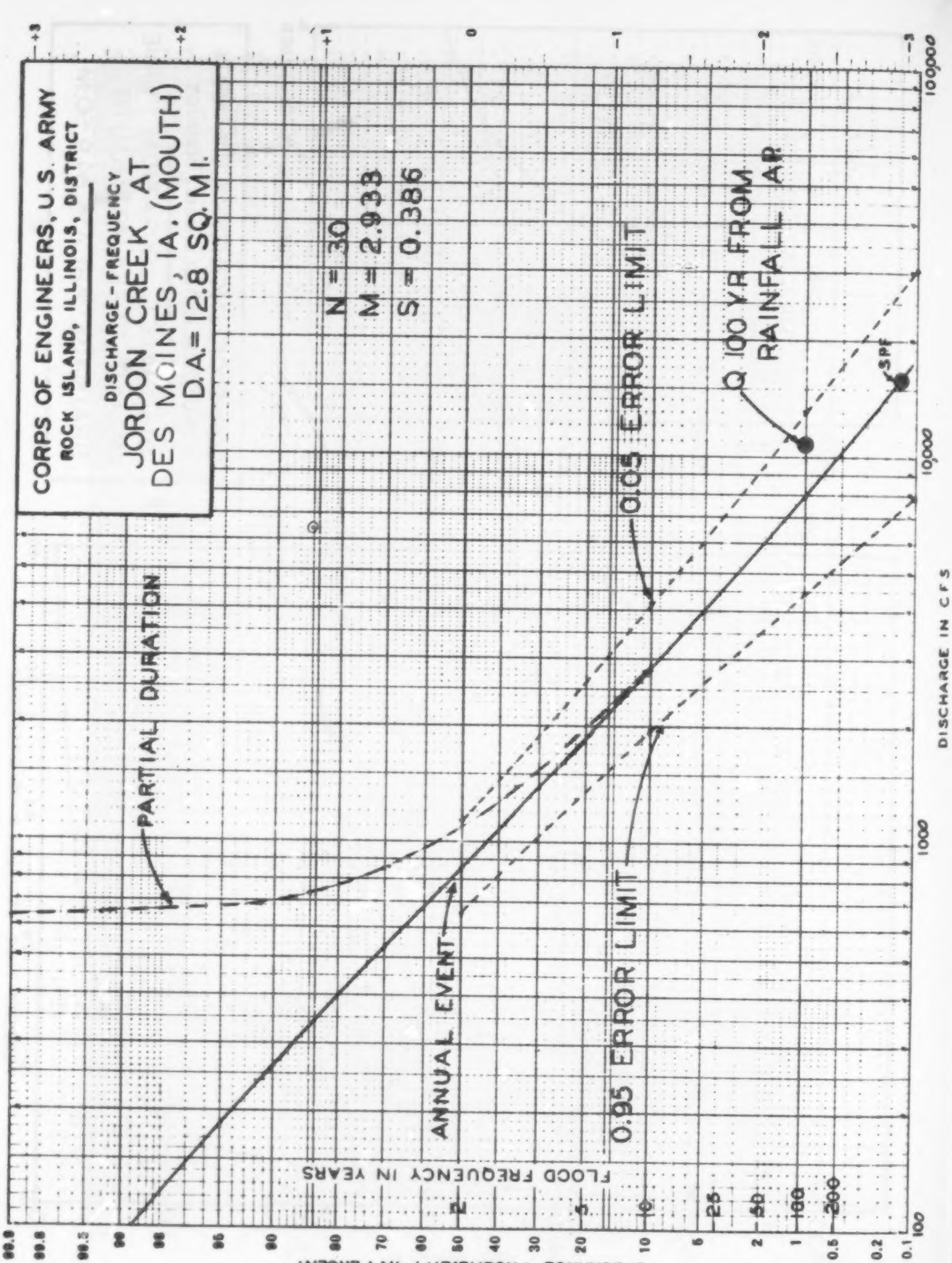
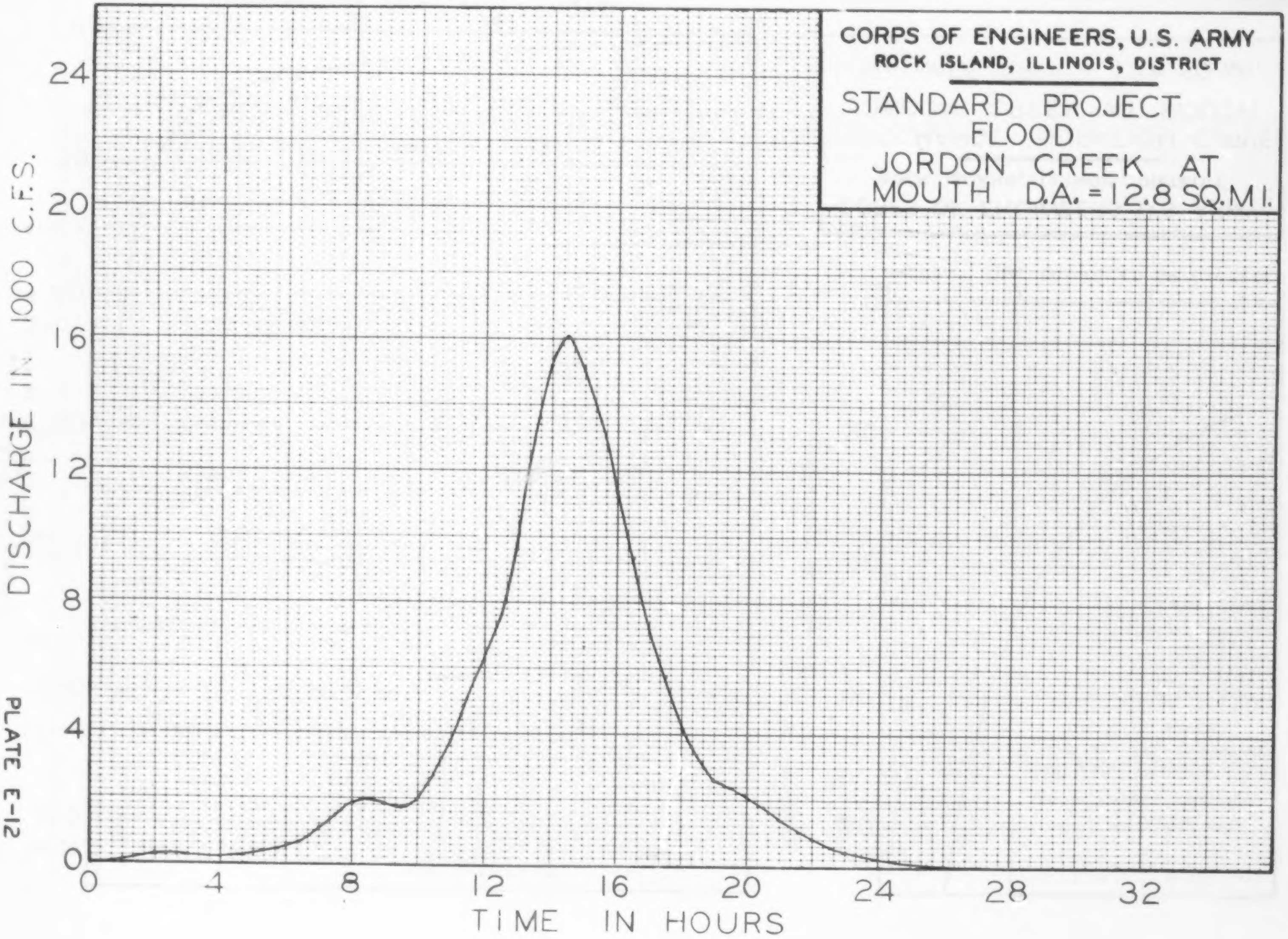

CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT
DISCHARGE - FREQUENCY
JORDON CREEK AT
DES MOINES, IA. (MOUTH)
D.A.= 12.8 SQ. MI.
N = 30
M = 2.933
S = 0.386
PARTIAL DURATION
ANNUAL EVENT
0.05 ERROR LIMIT
0.95 ERROR LIMIT
Q 100 YR FROM
RAINFALL AR
SPF
FLOOD FREQUENCY IN YEARS
2
5
10
25
50
100
200
DISCHARGE PROBABILITY IN PERCENT
99.9
99.8
99.5
99
98
95
90
80
70
60
50
40
30
20
10
5
2
1
0.5
0.2
0.1
DISCHARGE IN CFS
100
1000
10,000
100,000
+3
+2
+1
0
-1
-2
-3

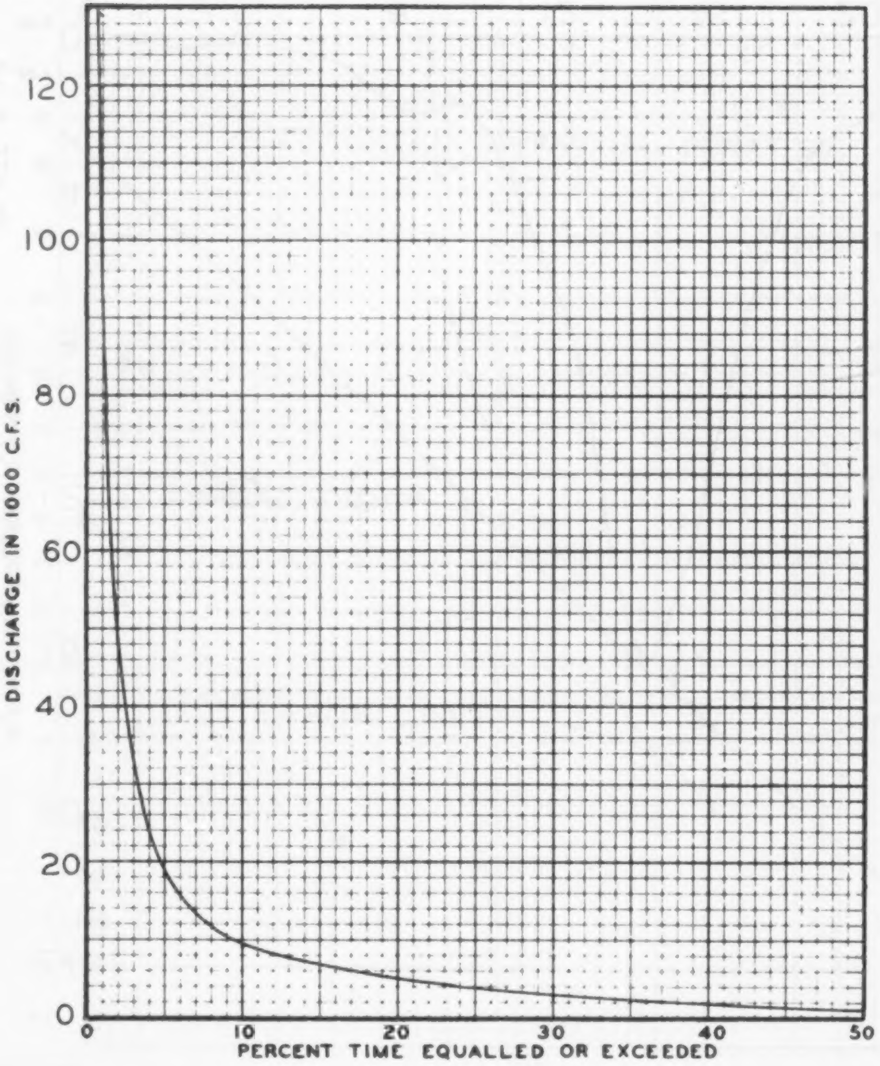
PLATE E-11

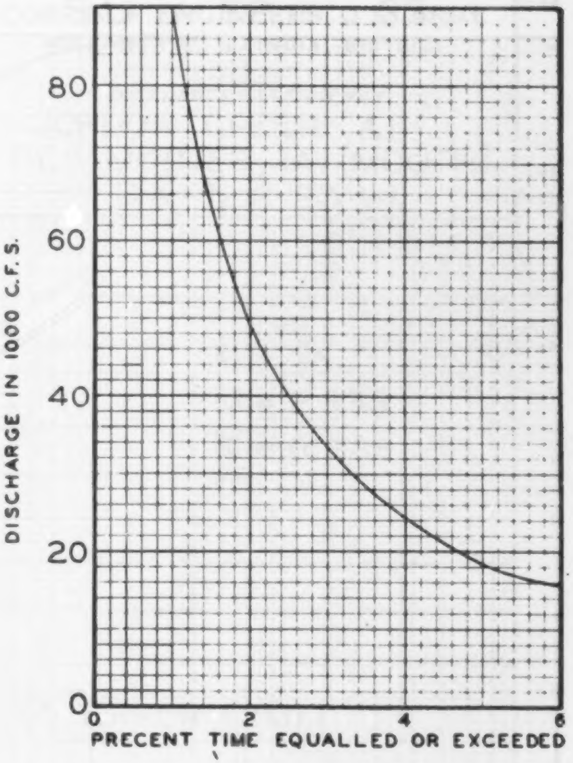


CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT

STANDARD PROJECT
FLOOD
JORDON CREEK AT
MOUTH D.A. = 12.8 SQ.MI.

PLATE E-12

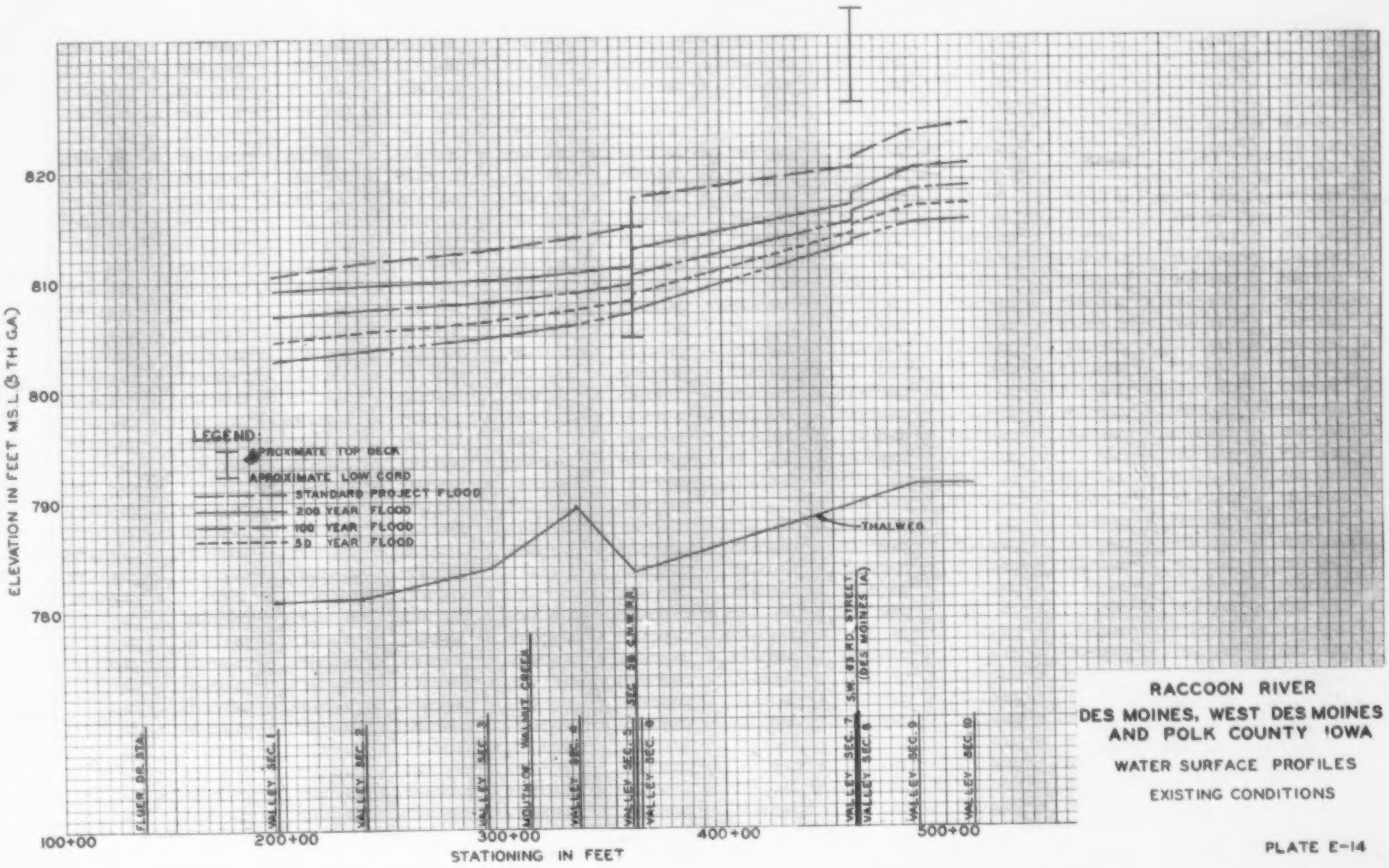




CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT

DISCHARGE DURATION CURVE
JORDON CREEK AT MOUTH
DRAINAGE AREA = 12.8 SQ.MI.

PLATE E-13

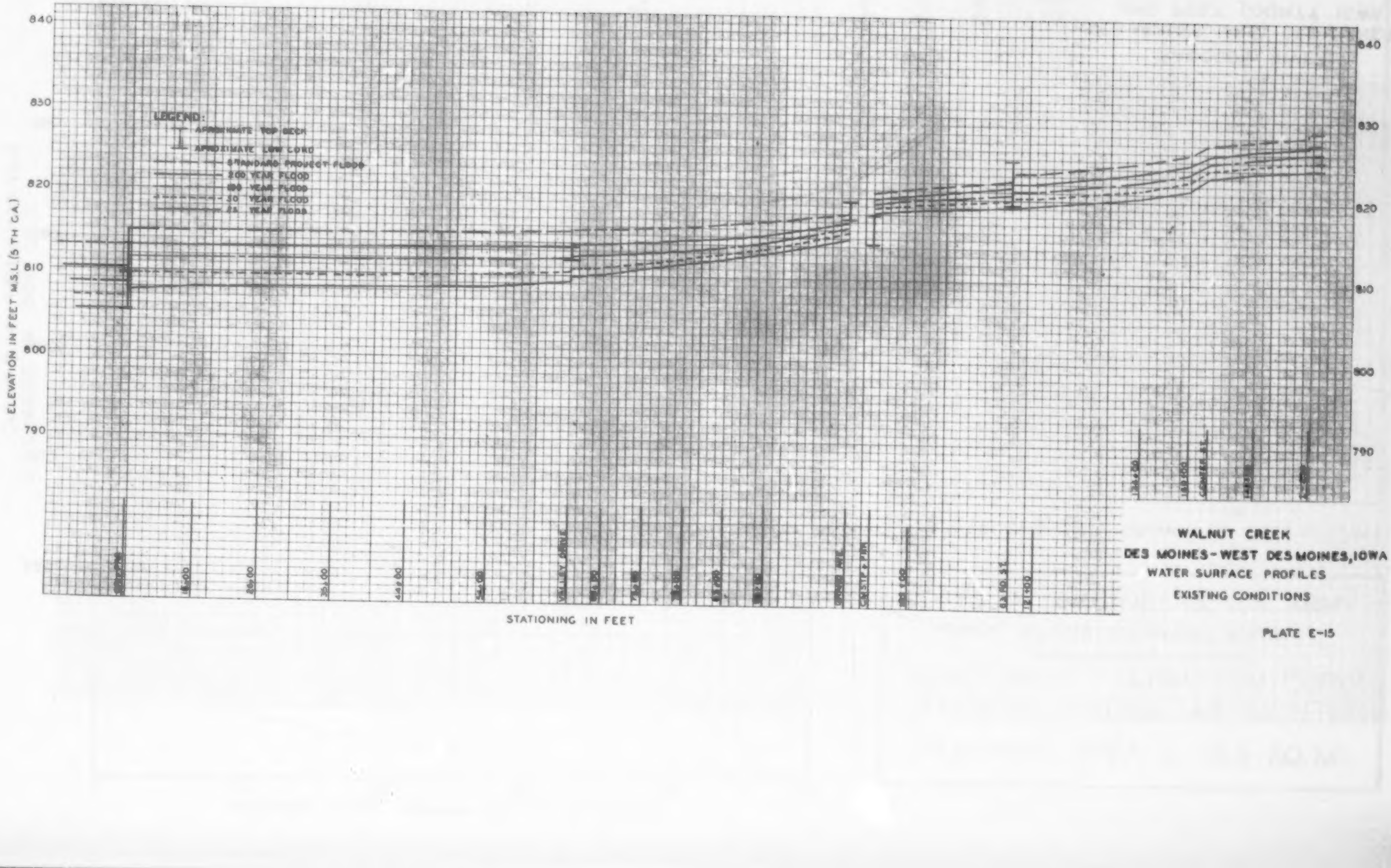


RACCOON RIVER
DES MOINES, WEST DES MOINES
AND POLK COUNTY IOWA

WATER SURFACE PROFILES

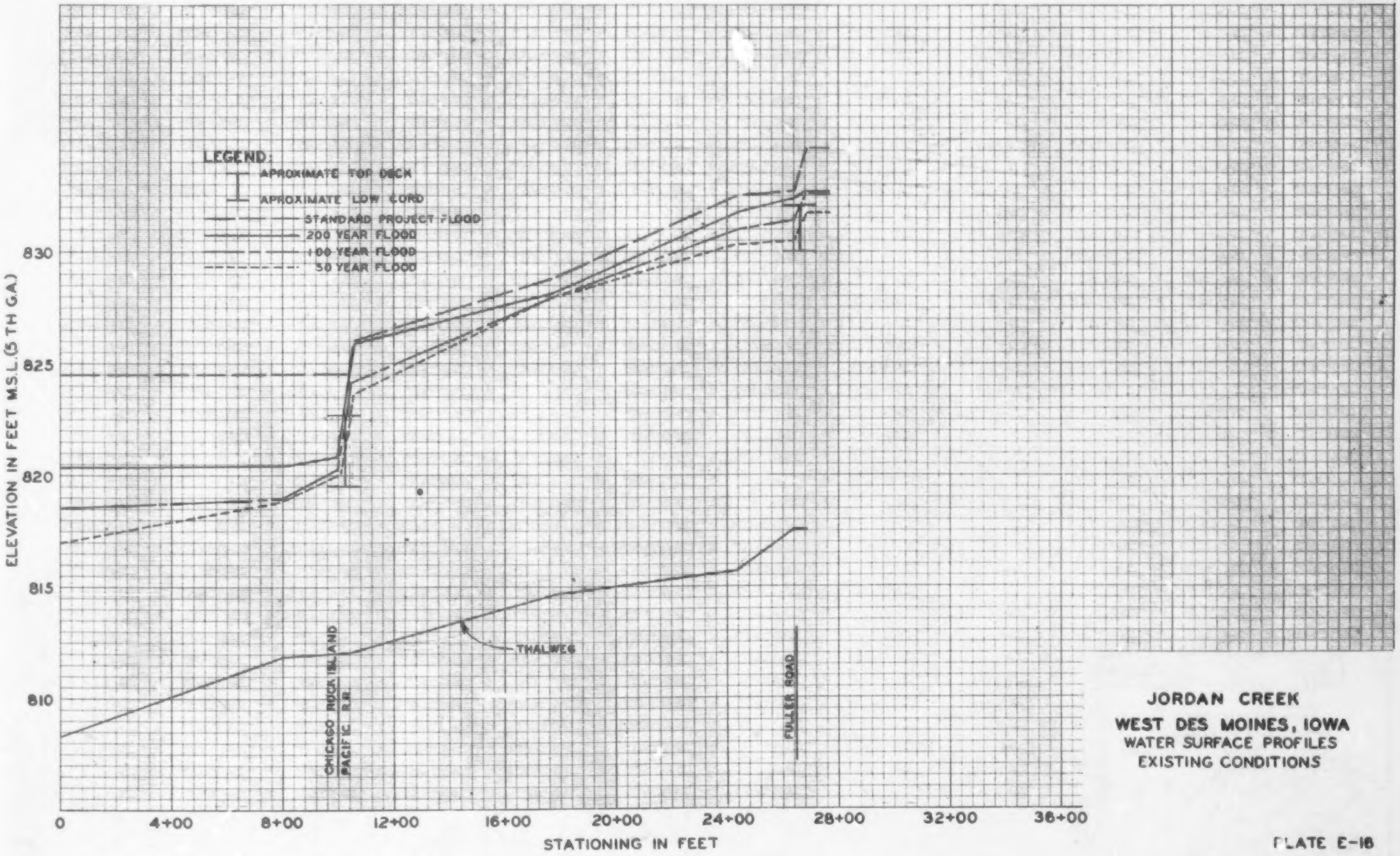
EXISTING CONDITIONS

PLATE E-14



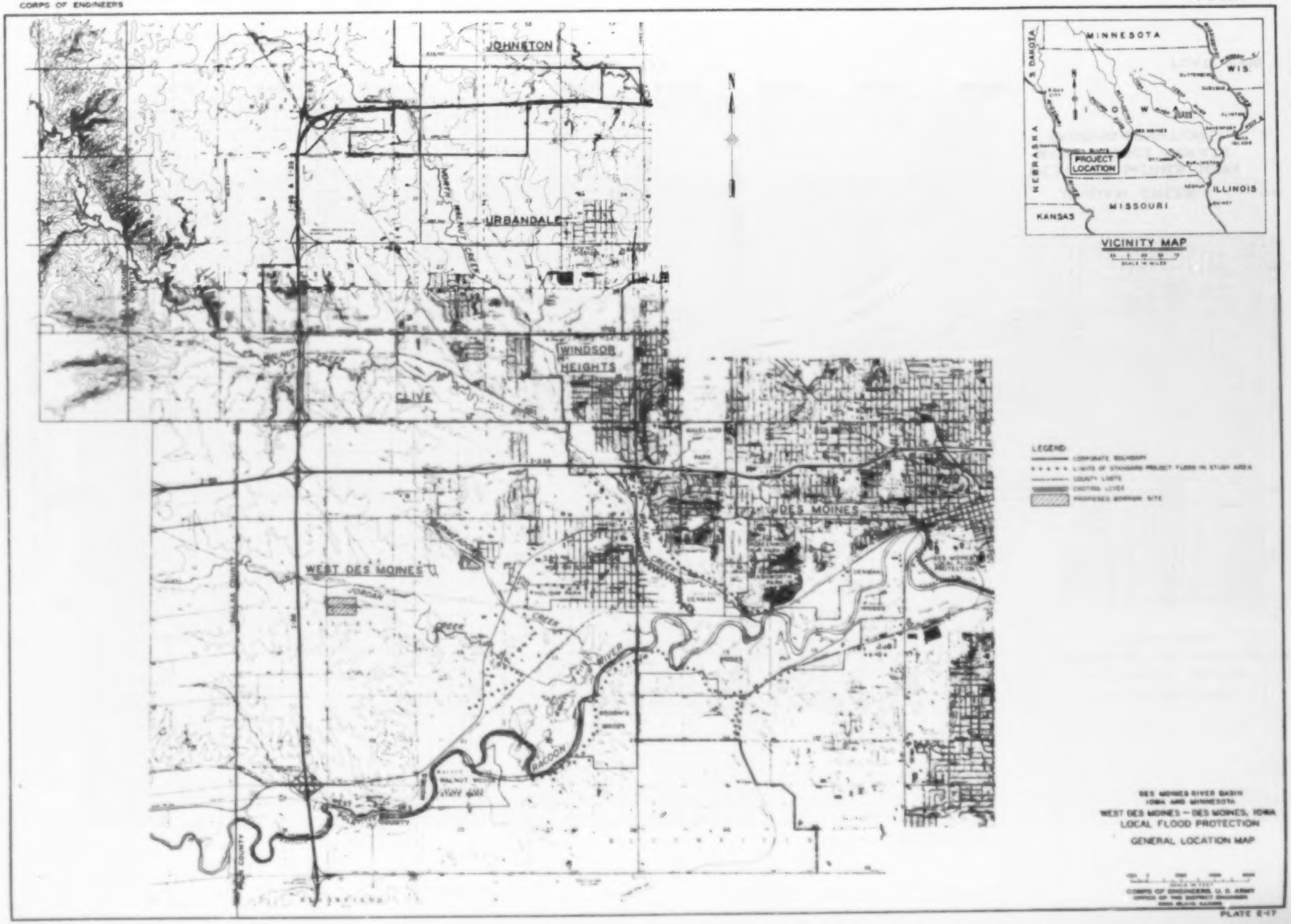
WALNUT CREEK
DES MOINES-WEST DES MOINES, IOWA
WATER SURFACE PROFILES
EXISTING CONDITIONS

PLATE E-15



JORDAN CREEK
WEST DES MOINES, IOWA
WATER SURFACE PROFILES
EXISTING CONDITIONS

PLATE E-16

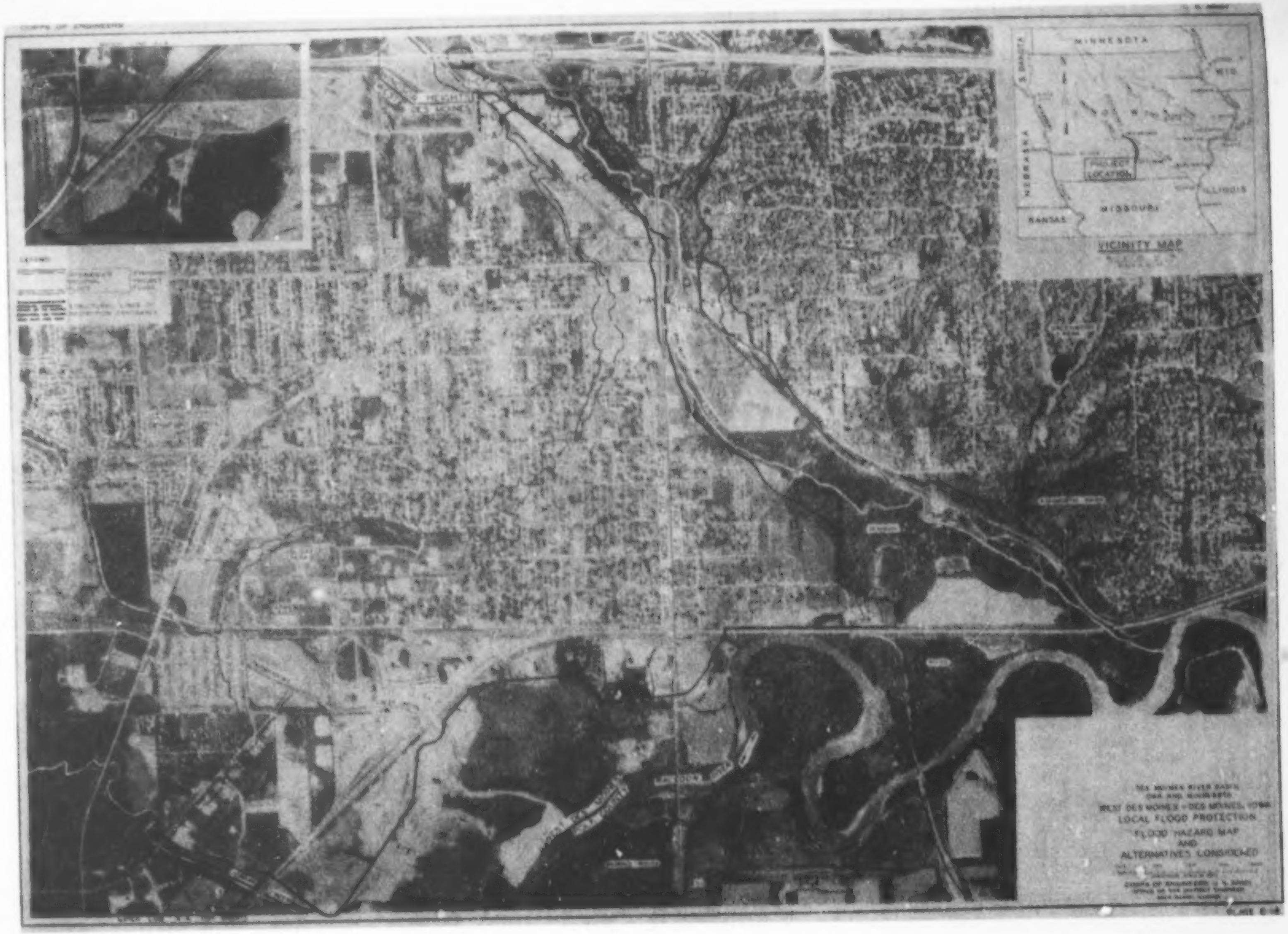

JOHNSTON
URBANDALE
NORTH WALNUT CREEK
WINDSOR HEIGHTS
CLIVE
WALNUT CREEK
DES MOINES
WEST DES MOINES
JORDAN CREEK
RACCOON RIVER
DALLAS COUNTY
POLK COUNTY
N
MINNESOTA
WIS
S DAKOTA
NEBRASKA
I O W A
DES MOINES
PROJECT LOCATION
ILLINOIS
MISSOURI
KANSAS
VICINITY MAP
SCALE IN MILES
LEGEND
CORPORATE BOUNDARY
LIMITS OF STANDARD PROJECT FLOOD IN STUDY AREA
COUNTY LIMITS
EXISTING LEVEE
PROPOSED BORROW SITE
SCALE IN FEET

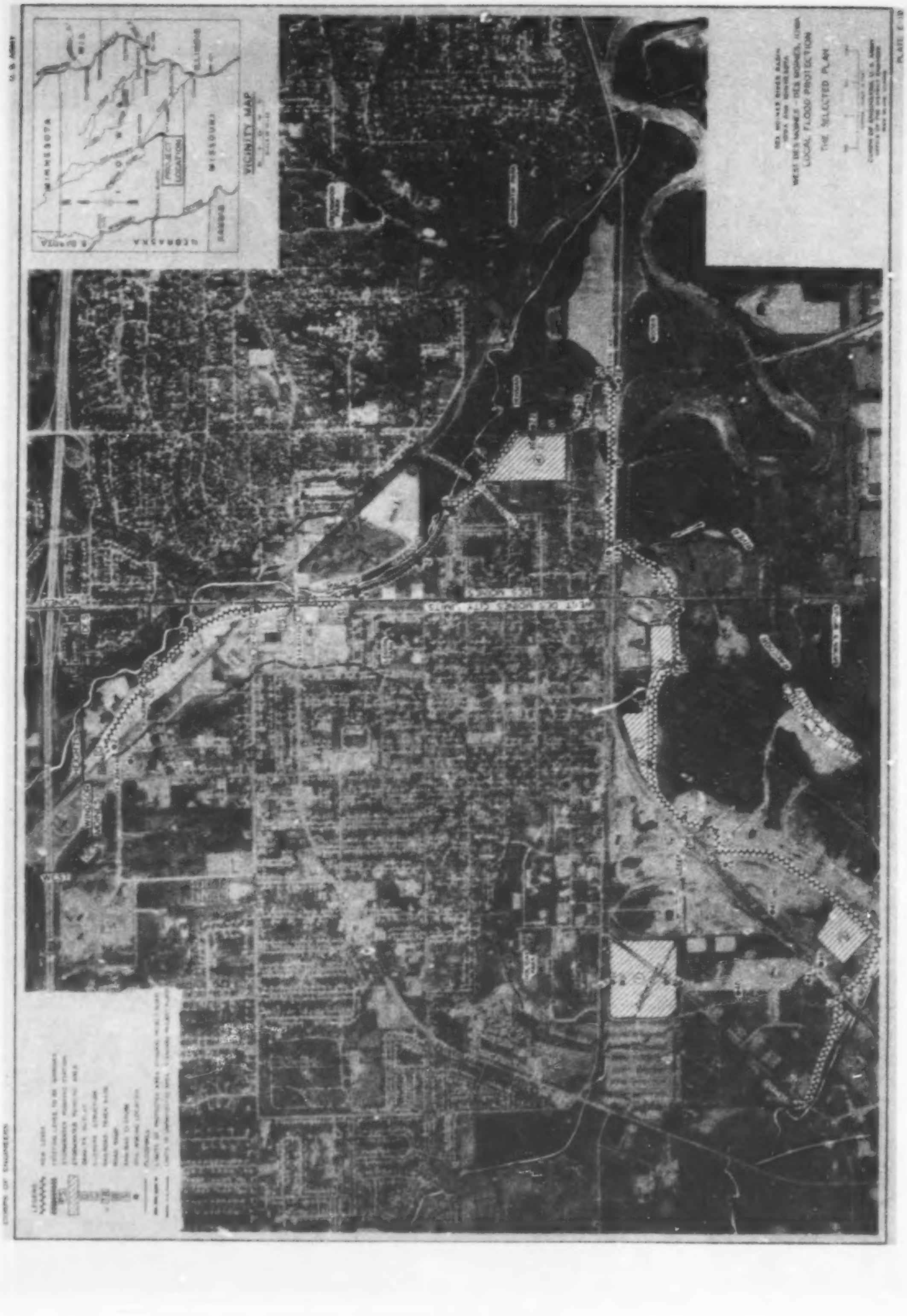
DES MOINES RIVER BASIN
IOWA AND MINNESOTA
WEST DES MOINES — DES MOINES, IOWA
LOCAL FLOOD PROTECTION

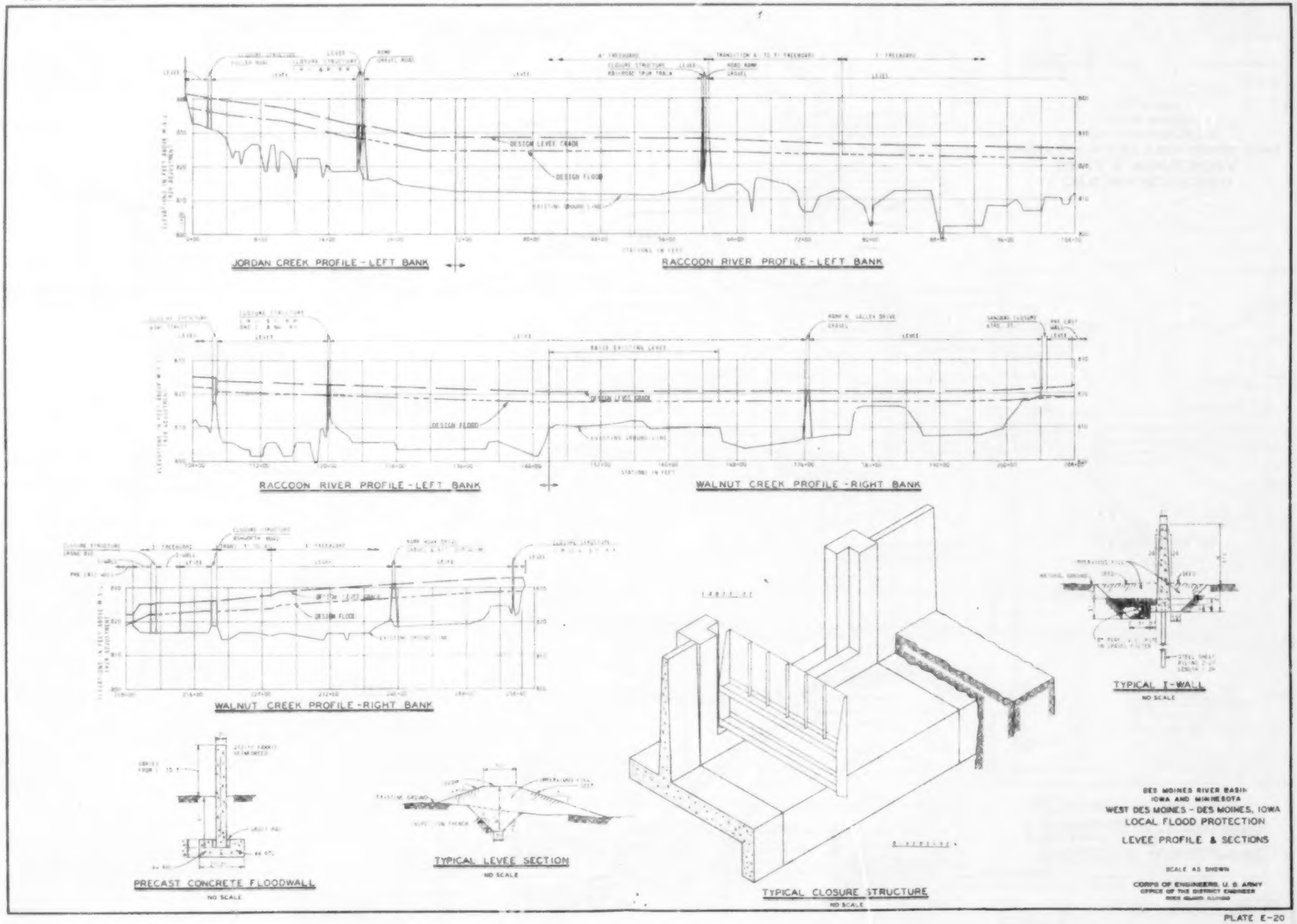
GENERAL LOCATION MAP

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ROCK ISLAND ILLINOIS

PLATE E-17


CORPS OF ENGINEERS
MINNESOTA
S. DAKOTA
WIS
NEBRASKA
PROJECT LOCATION
ILLINOIS
MISSOURI
KANSAS
VICINITY MAP
DES MOINES RIVER BASIN
IOWA AND MINNESOTA
WEST DES MOINES – DES MOINES, IOWA
LOCAL FLOOD PROTECTION
FLOOD HAZARD MAP
AND
ALTERNATIVES CONSIDERED
CORPS OF ENGINEERS U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ROCK ISLAND, ILLINOIS


U.S. ARMY
CORPS OF ENGINEERS
DES MOINES RIVER BASIN
IOWA AND MINNESOTA
WEST DES MOINES - DES MOINES, IOWA
LOCAL FLOOD PROTECTION
THE SELECTED PLAN
CORPS OF ENGINEERS, U.S. ARMY
VICINITY MAP
MINNESOTA
WIS.
ILLINOIS
MISSOURI
NEBRASKA
S. DAKOTA
KANSAS
PROJECT LOCATION
LEGEND
WEST DES MOINES CITY LIMITS


JORDAN CREEK PROFILE - LEFT BANK
RACCOON RIVER PROFILE - LEFT BANK
RACCOON RIVER PROFILE - LEFT BANK
WALNUT CREEK PROFILE - RIGHT BANK
WALNUT CREEK PROFILE - RIGHT BANK
DESIGN LEVEE GRADE
DESIGN FLOOD
EXISTING GROUND LINE
CLOSURE STRUCTURE
LEVEE
ROAD RAMP
GRAVEL
4' FREEBOARD
TRANSITION 4' TO 3' FREEBOARD
3' FREEBOARD
RAISE EXISTING LEVEE
STATIONS IN FEET
ELEVATIONS IN FEET ABOVE M.S.L.
800
810
820
830
840
0+00
8+00
16+00
24+00
32+00
40+00
48+00
56+00
64+00
72+00
80+00
88+00
96+00
104+00
PRECAST CONCRETE FLOODWALL
NO SCALE
TYPICAL LEVEE SECTION
NO SCALE
EXISTING GROUND
TYPICAL CLOSURE STRUCTURE
NO SCALE
TYPICAL I-WALL
NO SCALE
NATURAL GROUND
IMPERVIOUS FILL
STEEL SHEET PILING

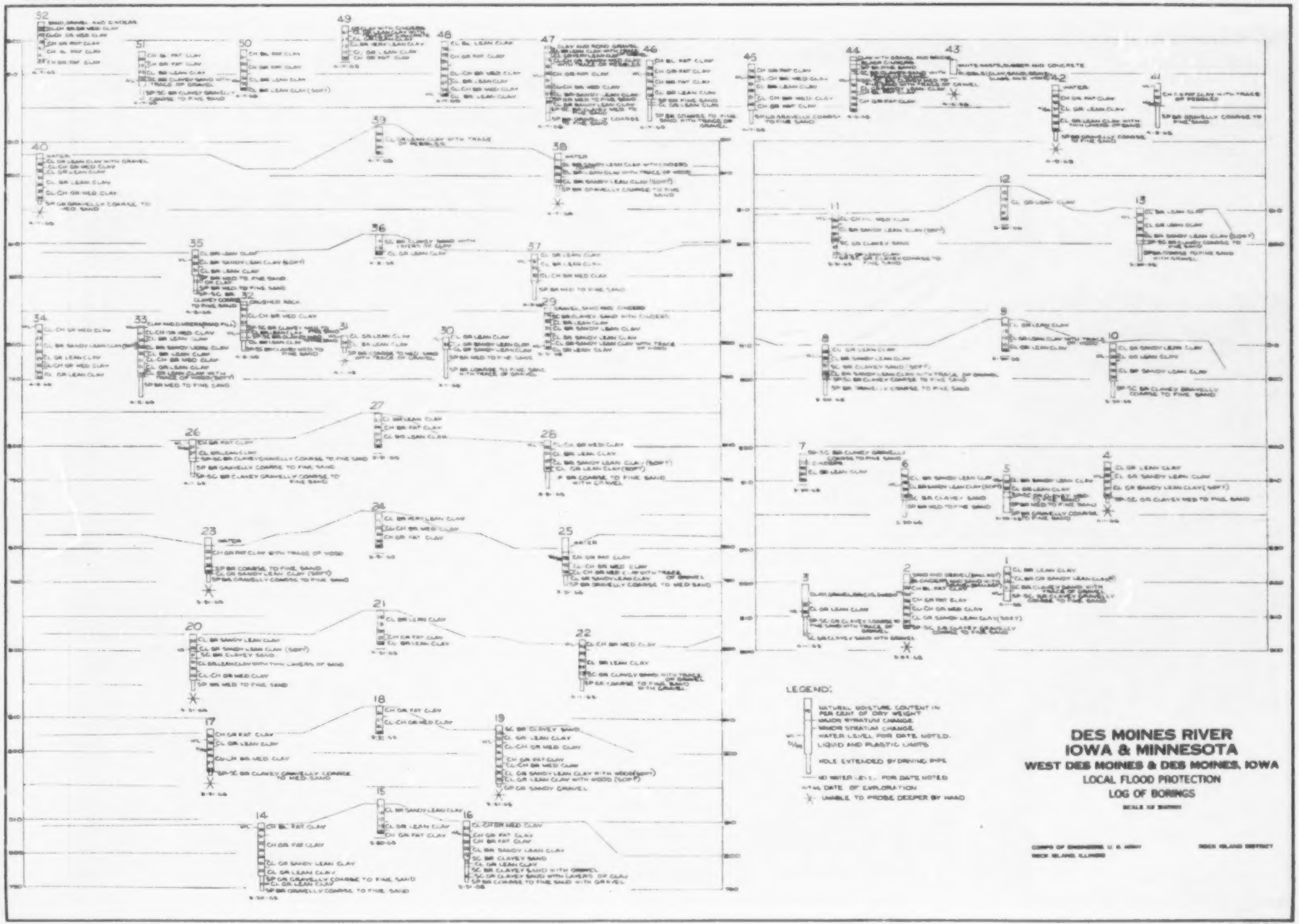
DES MOINES RIVER BASIN
IOWA AND MINNESOTA
WEST DES MOINES - DES MOINES, IOWA
LOCAL FLOOD PROTECTION
LEVEE PROFILE & SECTIONS

SCALE AS SHOWN

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ROCK ISLAND, ILLINOIS

PLATE E-20

CORPS OF ENGINEERS U. S. ARMY

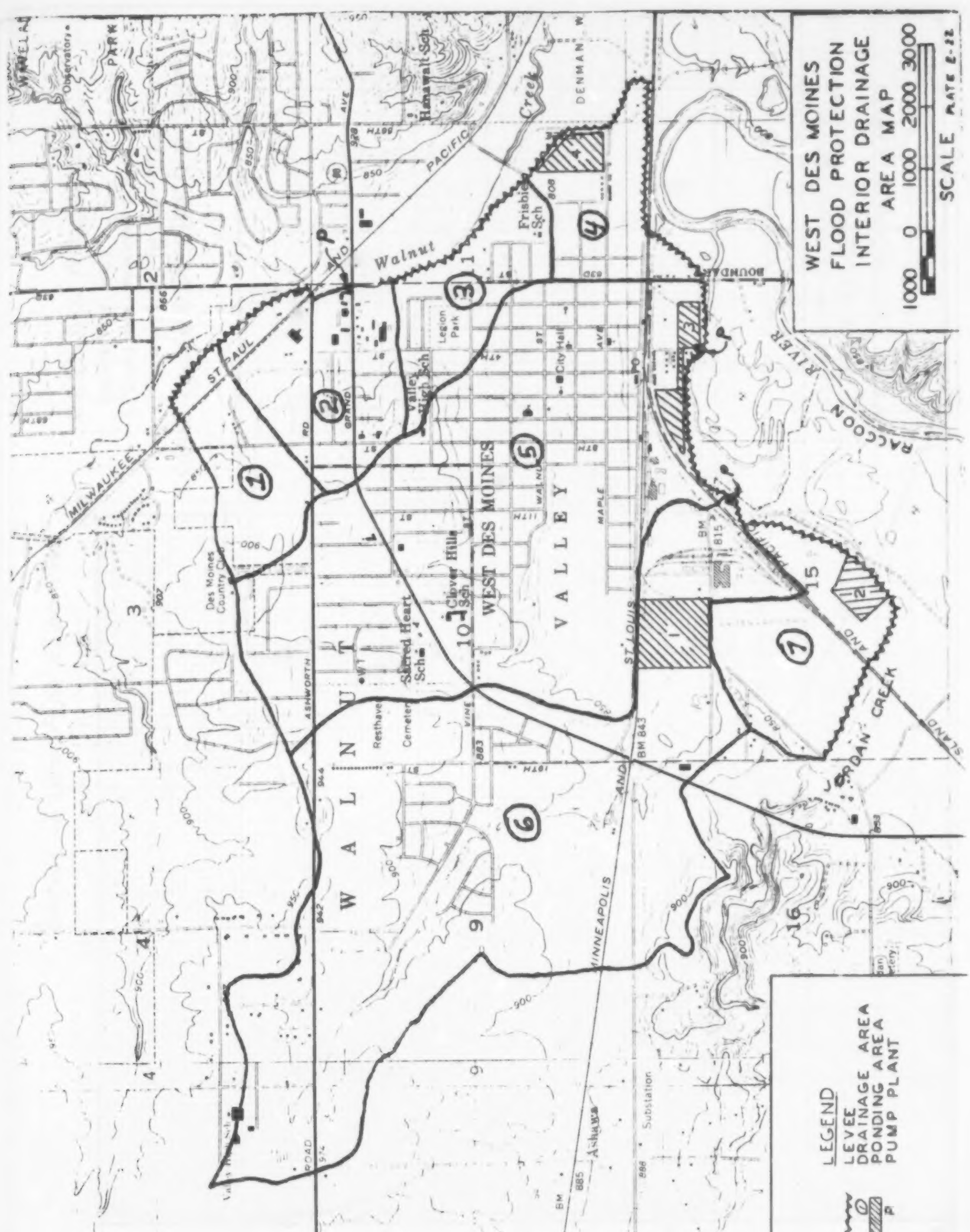

52
51
50
49
48
47
46
45
44
43
42
41
40
59
58
12
11
13
35
36
37
34
33
32
31
30
29
9
8
10
27
26
28
7
6
5
4
23
24
25
3
2
1
21
20
22
18
17
19
15
14
16
LEGEND:
NATURAL MOISTURE CONTENT IN PER CENT OF DRY WEIGHT
MAJOR STRATUM CHANGE
MINOR STRATUM CHANGE
WATER LEVEL FOR DATE NOTED.
LIQUID AND PLASTIC LIMITS
HOLE EXTENDED BY DRIVING PIPE
NO WATER LEVEL FOR DATE NOTED
DATE OF EXPLORATION
UNABLE TO PROBE DEEPER BY HAND

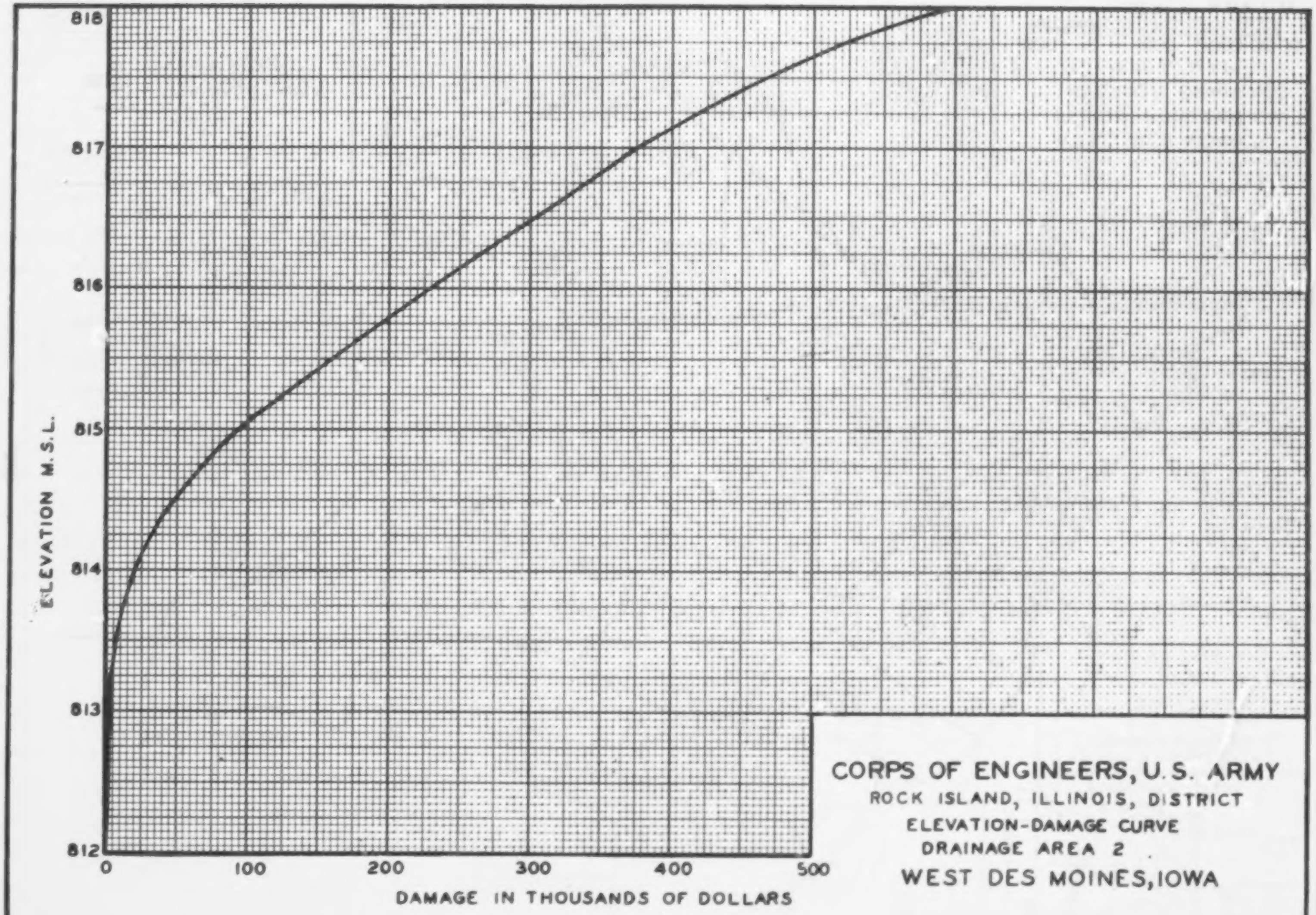
DES MOINES RIVER
IOWA & MINNESOTA
WEST DES MOINES & DES MOINES, IOWA
LOCAL FLOOD PROTECTION
LOG OF BORINGS

SCALE AS SHOWN

CORPS OF ENGINEERS U. S. ARMY
ROCK ISLAND, ILLINOIS

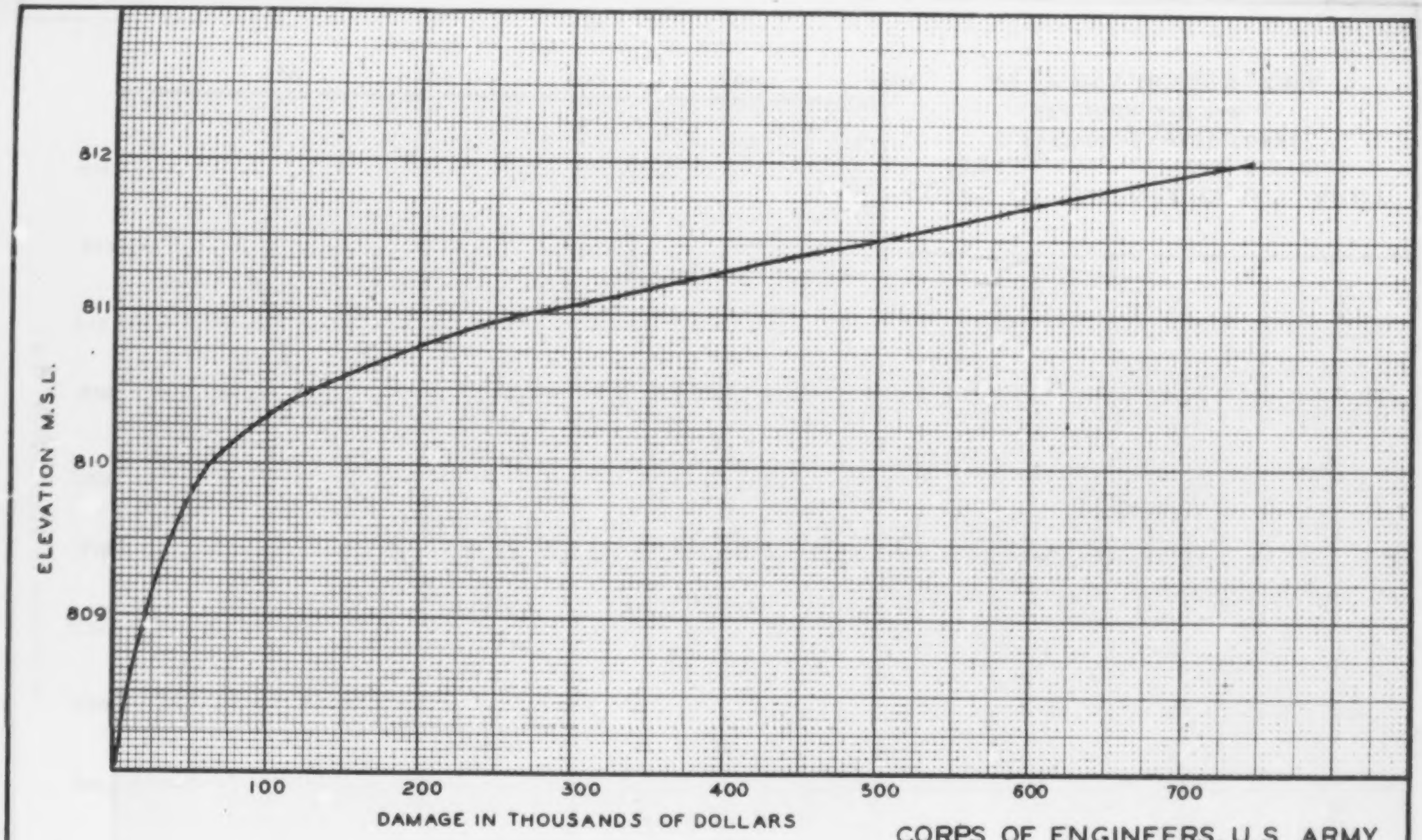
ROCK ISLAND DISTRICT


WEST DES MOINES
FLOOD PROTECTION
INTERIOR DRAINAGE
AREA MAP
SCALE
1000 0 1000 2000 3000
PLATE E-22
LEGEND
LEVEE
DRAINAGE AREA
PONDING AREA
PUMP PLANT
P
1
2
3
4
5
6
7
WALNUT VALLEY
WEST DES MOINES
Walnut
Creek
RACCOON RIVER
JORDAN CREEK
MILWAUKEE
ST PAUL
PACIFIC
MINNEAPOLIS
ST LOUIS
GRAND
ASHWORTH
MAPLE
VINE
DENMAN
BOUNDARY
Des Moines Country Club
Valley High Sch
Clover Hills Sch
Sacred Heart Sch
Resthaven Cemetery
Legion Park
City Hall
PO
Frisbie Sch
Hanawalt Sch
Observatory
PARK
Substation
Ashawa
BM 843
BM 815
BM 885
900
850
950



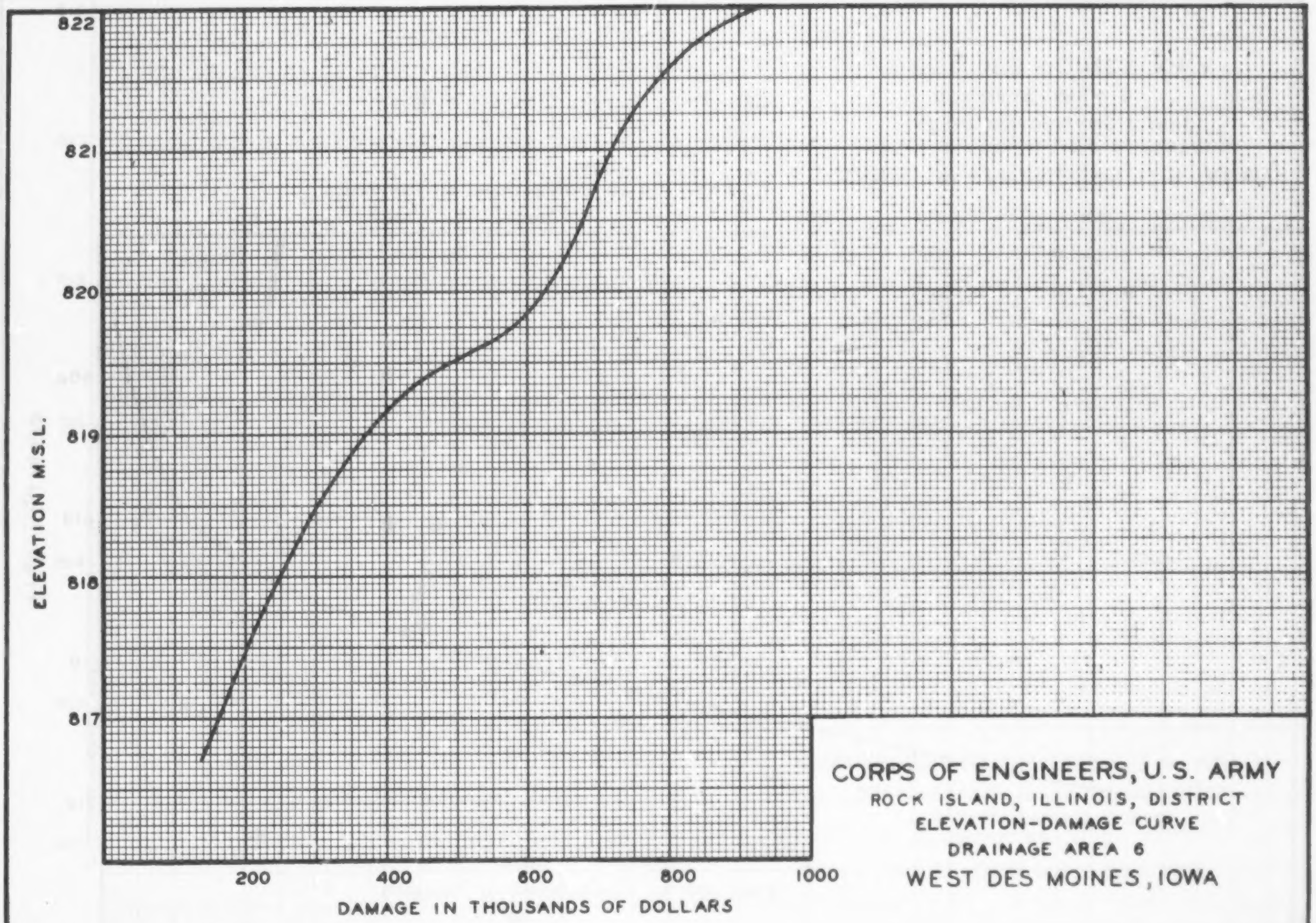
CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT
ELEVATION-DAMAGE CURVE
DRAINAGE AREA 2
WEST DES MOINES, IOWA

PLATE E-23



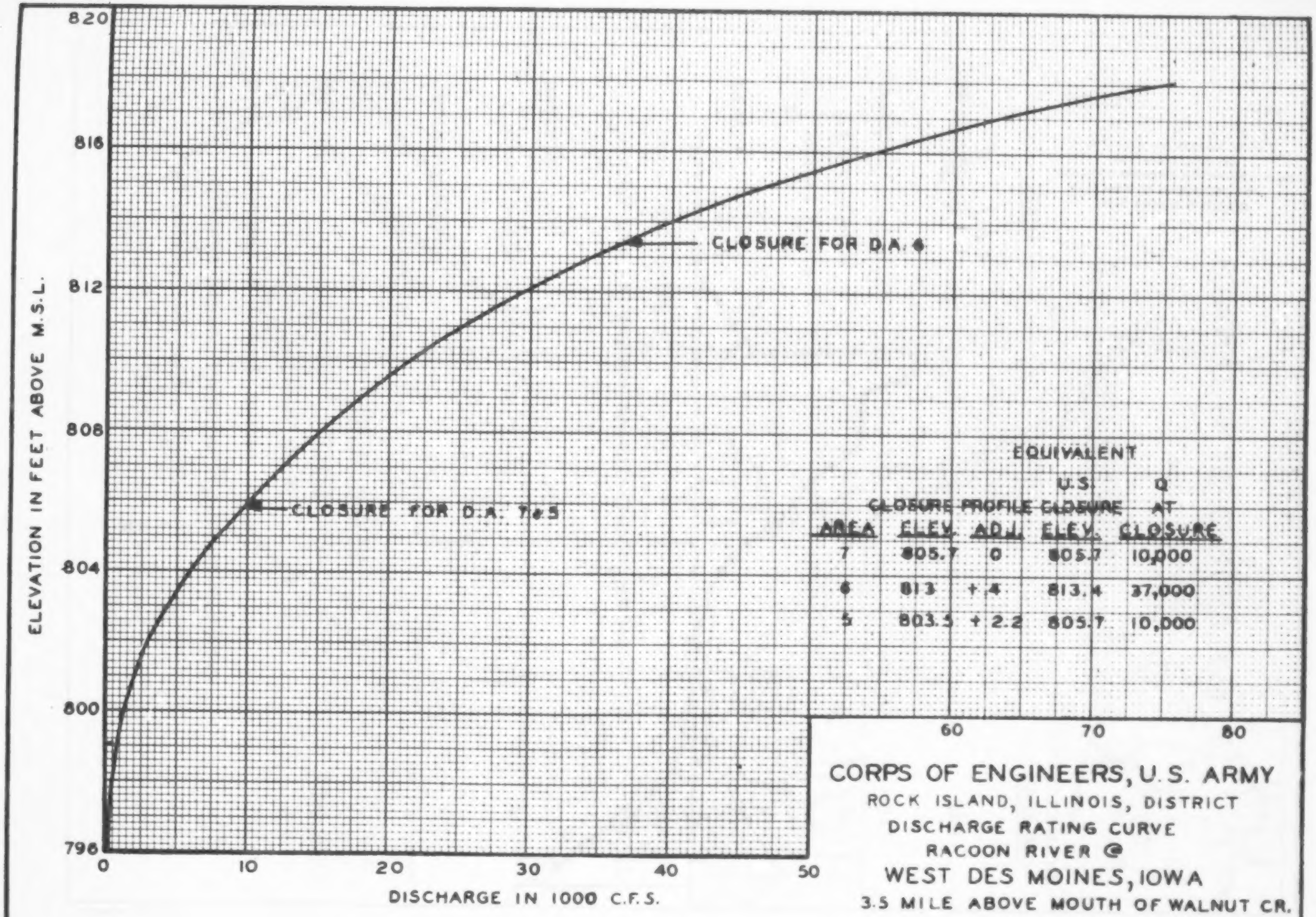
CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT
ELEVATION-DAMAGE CURVE
DRAINAGE AREA 5
WEST DES MOINES, IOWA

PLATE E-24



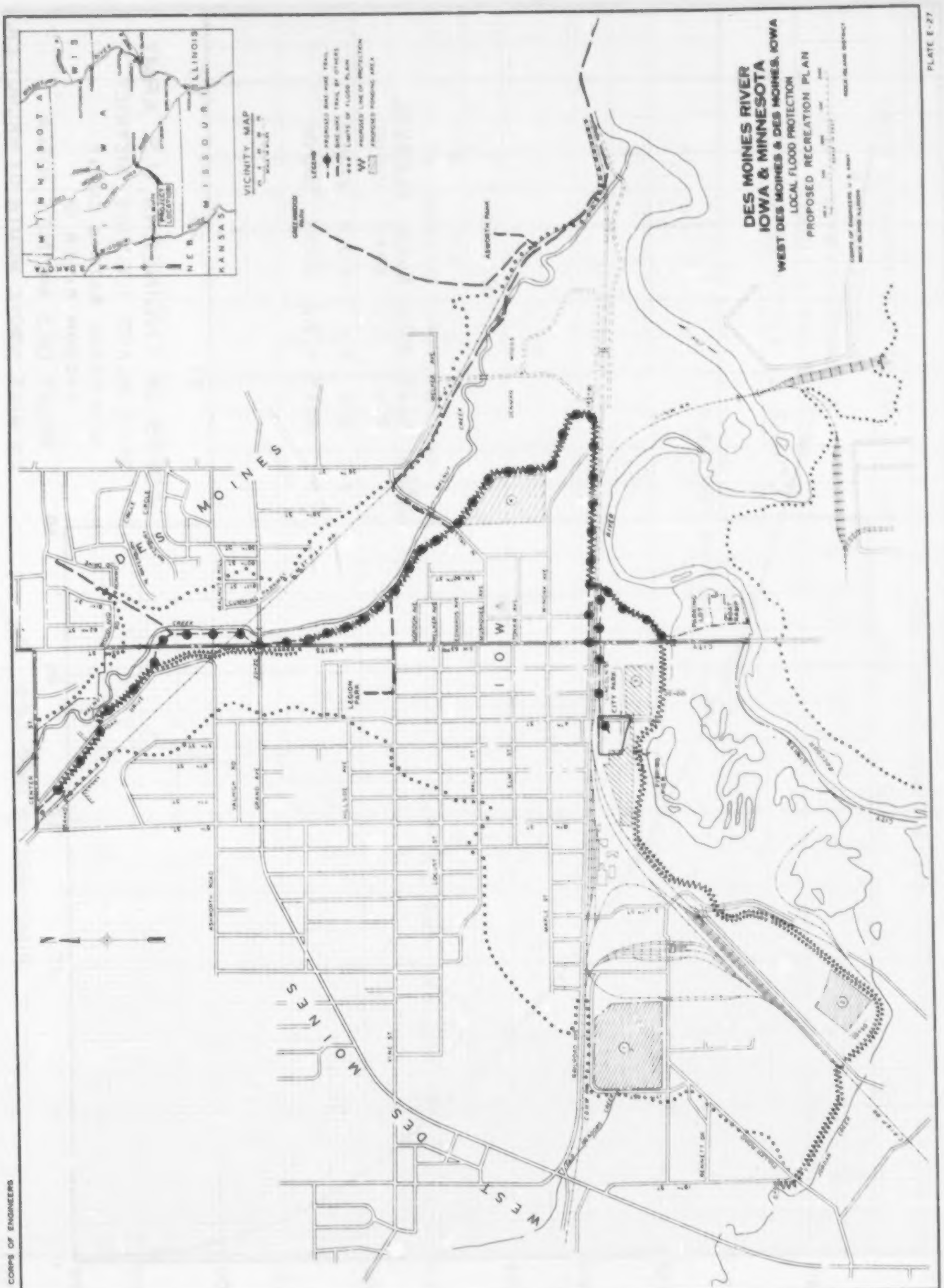
CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT
ELEVATION-DAMAGE CURVE
DRAINAGE AREA 6
WEST DES MOINES, IOWA

PLATE E-25



AREA	CLOSURE ELEV.	PROFILE ADJ.	EQUIVALENT U.S. CLOSURE ELEV.	Q AT CLOSURE
7	805.7	0	805.7	10,000
6	813	+ .4	813.4	37,000
5	803.5	+ 2.2	805.7	10,000

CORPS OF ENGINEERS, U.S. ARMY
ROCK ISLAND, ILLINOIS, DISTRICT
DISCHARGE RATING CURVE
RACOON RIVER @
WEST DES MOINES, IOWA
3.5 MILE ABOVE MOUTH OF WALNUT CR.


U.S. ARMY
CORPS OF ENGINEERS
PLATE E-27
DES MOINES RIVER
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SECTION F

ECONOMICS OF THE SELECTED PLAN

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SECTION F

ECONOMICS OF THE SELECTED PLAN

1. This section centralizes the data and computations of the economic study, including benefits and costs. Conclusions resulting from the analysis are usually readily quantifiable in dollar values.

METHODOLOGY

2. The primary purpose of an economic analysis is to provide tangible economic justification of proposed improvements. A project's degree of justification can be determined by comparing the equivalent annual charges of the project's costs with an estimate of equivalent average annual benefits that would probably be realized over the life of the project.

3. Project costs and benefits must also be referenced to a common time. The value given to benefits and costs at their time of

accrual are made comparable, time wise, by conversion to an equivalent time using an appropriate interest rate. The current approved interest rate applicable to public projects is 6-1/8 percent. Values using other rates are also furnished to give a range of benefit-cost relationships.

4. The flood control project selected should afford a high quality and degree of protection; and therefore, the physical life of the works should exceed 100 years. Accordingly, a 100-year economic life was selected for the project. Operation and maintenance costs would be incurred each year.

5. Standard Corps of Engineers practice is used in developing costs and benefits. Costs include estimates of the value of all goods and services used to construct, operate and maintain the project. Benefits involve estimates of flood damages prevented and other values created. The primary benefit is the reduction of flood damage. The project reduces the average annual flood damage by protecting homes, businesses, and other establishments in the flood plain. Damage curves are developed for the protected area from information collected from damage surveys of recorded floods, and also from personal interviews with property owners, Government officials, etc. The information is correlated with trends in areas with similar characteristics and is related to river stage or elevation. This material is then related to frequency data to convert it to average annual values. Modifications in this data, introduced by project effects, permit the computation of annual benefits. Growth values are also introduced to allow for normal development trends. Selected growth values assume local compliance with the provisions of the Disaster Protection Act of 1973.

6. Maximizing net tangible benefits is another consideration. Studies are made to determine costs and corresponding benefits

resulting from projects which provide protection against floods of various frequencies. From this information a curve is plotted to describe benefit changes with each added increment of costs. This curve enables the economist to scale a project or investment, to the point where benefits exceed costs by the greatest degree. This is the point where the last increment in project size has an incremental cost equal to incremental benefits, and any further increase in size would not be economically justified. Maximization does not, however, reflect intangible values.

COSTS

FIRST COSTS

7. The estimate of first costs shown in table F-1 are for construction of the project as described in Section E and shown on plate E-19. Quantities were estimated on the basis of a preliminary design. Unit costs are based on March 1975 prices. A contingency allowance of 20 percent is included. Engineering and design and supervision and administration are estimated lump-sum items based on similar projects and amount to 8 percent and 6 percent respectively. Details of the estimate are presented in table F-1.

Table F-1

DETAILED ESTIMATE OF COST

Description	Quantity	Unit	Unit Cost	Amount	
				Federal	Non-Federal
LANDS AND DAMAGES					
Levee Rights-of-way and Ponding Areas	1	Job	Sum		$ 993,000
Borrow Area	1	Job	Sum		411,000
	TOTAL LANDS AND DAMAGES				$1,404,000
RELOCATIONS					
Utilities, Sanitary Sewer Gates, Wells, Manholes					
Sta. 7+00-10" Gate and Well	1	Job	Sum	17,000	
Manhole	1	Job	Sum	3,000	
Sta. 18+00-15" Gate and Well	1	Job	Sum	17,500	
Manhole	1	Job	Sum	2,250	
Sta. 145+90-42" Gate and Well	1	Job	Sum	35,000	
Manhole	1	Job	Sum	2,000	
Sta. 211+00-10" Gate and Well	1	Job	Sum	13,000	
Manhole	1	Job	Sum	2,000	
Sta. 211+00-15" Gate and Well	1	Job	Sum	13,500	
Manhole	1	Job	Sum	2,500	
Sta. 219+00-36" Gate and Well	1	Job	Sum	28,000	
Manhole	1	Job	Sum	2,375	
Sta. 239+60-36" Gate and Well	1	Job	Sum	22,500	
Manhole	1	Job	Sum	2,375	
Manhole Raise	1	Job	Sum	1,300	
Utilities					
Waterlines					
Sta. 2+20-16"	52	L.F.	$ 34.00	1,768	
16" Valve	1	Each	2,000.00	2,200	
Sta. 3+00-10"	58	L.F.	24.00	1,392	
10" Valve	1	Each	1,000.00	1,000	

Table F-1 (Cont'd)

Description	Quantity	Unit	Unit Cost	Amount	
				Federal	Non-Federal
Sta. 20+10-8"	87	L.F.	$ 21.00	$ 1,827	
8" Valve	1	Each	700.00	700	
Sta. 46+00-4"	84	L.F.	15.00	1,260	
4" Valve	1	Each	300.00	300	
Sta. 54+00-4"	84	L.F.	15.00	1,260	
4" Valve	1	Each	300.00	300	
Sta. 211+00-6"	50	L.F.	18.00	900	
6" Valve	1	Each	500.00	500	
Sta. 215+00-6"	50	L.F.	18.00	900	
6" Valve	1	Each	500.00	500	
Sta. 239+60-6"	68	L.F.	18.00	1,224	
6" Valve	1	Each	500.00	500	
Powerline	1	Job	Sum		$ 26,800
Telephone Line	1	Job	Sum		23,500
	Subtotal			$ 180,830	$ 50,300
	Contingencies			36,170	9,700
	TOTAL RELOCATIONS			$ 217,000	$ 60,000
LEVEES AND FLOODWALLS					
Embankment-In Place					
From Ponding Area 2	52,000	C.Y.	$ .75	$ 47,250	
From Ponding Area 4	63,000	C.Y.	.75	39,000	
From Borrow	571,500	C.Y.	2.50	1,428,750	
Stripping-6"	41,800	C.Y.	.65	27,170	
Inspection Trench	69,755	C.Y.	.75	52,320	
Seeding	57	Acres	650.00	37,050	
Precast Wall					
Sta. 207+70-208+80	1	Job	Sum 1	6,650	
I-Wall					
Sta. 208+80-210+95 and Sta. 211+45-214+30	1	Job	Sum	161,150	
	Subtotal			$1,799,340	
	Contingencies			360,660	
	TOTAL LEVEES and FLOODWALLS			$2,160,000	
CLOSURE STRUCTURES					
Chicago, Rock Island and Pacific Railroad Sta. 19+50	1	Job	Sum	$ 52,300	
Railroad Siding Sta. 60+00	1	Job	Sum	75,000	
Fuller Road Sta. 2+00	1	Job	Sum	67,000	

Table F-1 (Cont'd)

Description	Quantity	Unit	Unit Cost	Amount	
				Federal	Non-Federal
63rd St. Sta. 106+50	1	Job	Sum	$ 60,000	
Chicago, Rock Island and Pacific and Chicago Northwestern Railroad Sta. 120+00	1	Job	Sum	56,000	
Grand Avenue Sta. 211+20	1	Job	Sum	104,400	
Ashworth Road and Chicago, Milwaukee, St. Paul and Pacific Railroad Sta. 218+20	1	Job	Sum	73,000	
C.M.St.P.&P. RR Sta. 253+50	1	Job	Sum	40,500	
	Subtotal			$ 528,200	
	Contingencies			105,800	
	TOTAL CLOSURE STRUCTURES			$ 634,000	
ROAD RAMPS					
Road Ramps					
Ramp at Sta 20+12					
Embankment	15,300	C.Y.	$ 2.50	$ 38,250	
Gravel-6"	280	C.Y.	8.00	2,240	
Stripping-6"	1,000	C.Y.	.65	650	
Ramp at Sta. 60+45					
Embankment	11,800	C.Y.	2.50	29,500	
Gravel-6"	250	C.Y.	8.00	2,000	
Stripping-6"	900	C.Y.	.65	585	
Valley Drive Sta. 176+00					
Embankment	9,000	C.Y.	2.50	22,500	
Gravel	230	C.Y.	8.00	1,840	
Stripping	700	C.Y.	.65	455	
Hoak Drive					
Embankment	9,000	C.Y.	2.50	22,500	
Gravel-6"	230	C.Y.	8.00	1,840	
Bituminous Surfacing	1,370	S.Y.	6.00	8,340	
Stripping-6" Sta. 239+60	700	C.Y.	.65	455	
	Subtotal			$ 131,155	
	Contingencies			26,845	
	TOTAL RAMPS			$ 158,000	

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Table F-1 (Cont'd)

Description	Quantity	Unit	Unit Cost	Amount	
				Federal	Non-Federal
DRAINAGE FACILITIES					
Area 1					
48" Sluice Gate w/Well and Flap Gate	1	Job	Sum	$ 50,000	
Area 2					
24" RCP	180	L.F.	30.00	5,400	
24" Sluice Gate w/Well Flap Gate and Manhole	1	Job	Sum	24,000	
Abandon 24" CMP	20	L.F.	3.00	60	
36" Sluice Gate w/Well and Flap Gate	1	Job	Sum	31,000	
36" Sluice Gate w/Well and Flap Gate	1	Job	Sum	31,000	
36" Sluice Gate w/Well and Flap Gate	1	Job	Sum	31,000	
24" Sluice Gate w/Well and Flap Gate	1	Job	Sum	22,000	
Interceptor Sewer					
24" RCP	385	L.F.	30.00	11,550	
24" RCP	290	L.F.	30.00	8,700	
24" RCP	80	L.F.	30.00	2,400	
Area 3					
Abandon 24" CMP	40	L.F.	3.00	120	
21" and 30" Sluice Gates w/Well and Flap Gate	1	Job	Sum	39,000	
Abandon 18" CMP	40	L.F.	2.00	80	
Area 4					
Abandon 24" CMP	40	L.F.	2.00	80	
Abandon 24" CMP	40	L.F.	2.00	80	
48" RCP	100	L.F.	60.00	6,000	
48" Sluice Gate w/Well and Flap Gate	1	Job	Sum	38,000	
Abandon 18" CMP	40	L.F.	2.00	80	
Abandon 36" CMP	50	L.F.	3.00	150	
Abandon Twin 24" CMP	80	L.F.	4.00	320	
36" CMP	120	L.F.	40.00	4,800	

Table F-1 (Cont'd)

Description	Quantity	Unit	Unit Cost	Amount	
				Federal	Non-Federal
36" Sluice Gate w/Well and Flap Gate	1	Job	Sum	$ 31,000	
Plug 36" RCP	1	Job	Sum	2,000	
36" RCP	700	L.F.	42.00	22,400	
Area 5					
Twin 48" CMP	95	L.F.	120.00	11,400	
Twin 48" Sluice Gates w/Well and Flap Gates	1	Job	Sum	75,000	
8' x 6' RCB	50	L.F.	350.00	17,500	
Area 6					
Four 5' x 7' RCB (100' each)	100	L.F.	800.00	80,000	
Four 5' x 7' Sluice Gates w/Wells	1	Job	Sum	160,000	
8' x 6' Sluice Gate	1	Job	Sum	12,000	
Area 7					
Twin 48" RCP (100' each)	100	L.F.	120.00	12,000	
Twin 48" Sluice Gates w/Well and Flap Gates	1	Job	Sum	70,000	
Chain Link Fence	2,000	L.F.	15.00	30,000	
Pumping Plants					
70 c.f.s. Plant Area 2	1	Job	Sum	200,000	
104 c.f.s. Plant Area 5	1	Job	Sum	260,000	
27 c.f.s. Plant Area 6	1	Job	Sum	90,000	
	Subtotal			$1,409,120	
	Contingencies			212,880	
	TOTAL DRAINAGE FACILITIES			$1,622,000	
BUILDINGS AND GROUNDS					
Beautification					
Landscape Ponding Areas	1	Job	Sum	$ 29,000	
Trees and Flowering Shrubs	1	Job	Sum	26,000	
	Subtotal			$ 55,000	
	Contingencies			11,000	
	TOTAL BUILDINGS AND GROUNDS			$ 66,000	

Table F-1 (Cont'd)

Description	Quantity	Unit	Unit Cost	Amount Federal	Amount Non-Federal
RECREATION FACILITIES					
DES MOINES					
Boat Launch Downstream of 63rd St. along Raccoon River					
Gravel Parking Lot	1	Job	Sum		$ 2,500
Concrete Boat Ramp	1	Job	Sum		3,500
Gravel Access Road	1	Job	Sum		2,000
Asphalt Bicycle Trail	14,000	Lin Ft	4.50		63,000
	SUBTOTAL				$71,000
	CONTINGENCIES				14,000
	TOTAL RECREATION FACILITIES - DES MOINES				$85,000

(Total to be added to Lands and Damages and shared 50% Federal, 50% Non-Federal.)

Description	Quantity	Unit	Unit Cost	Amount Federal	Amount Non-Federal
WEST DES MOINES					
City Park at Sta. 90+00					
Interior Roads	1	Job	Sum		$ 5,000
Parking Lot	1	Job	Sum		3,000
Outdoor Furniture	1	Job	Sum		2,000
Landscaping and Grading	1	Job	Sum		8,000
Fishing Pier	1	Job	Sum		1,400
Asphalt Bike Trail	2,800	Lin Ft	4.50		12,600
	SUBTOTAL				$32,000
	CONTINGENCIES				6,000
	TOTAL RECREATION FACILITIES - WEST DES MOINES				$38,000

(Total to be added to Lands and Damages and shared 50% Federal, 50% Non-Federal.)

Table F-1 (Cont'd)

SUMMARY

	Federal	Non-Federal
LANDS AND DAMAGES		$1,404,000
RELOCATIONS	$ 217,000	60,000
LEVEES AND FLOODWALLS	2,160,000	
CLOSURE STRUCTURES	634,000	
RAMPS AND SANDBAG CLOSURE	158,000	
DRAINAGE FACILITIES	1,622,000	
BUILDINGS AND GROUNDS	66,000	
RECREATIONAL FACILITIES	93,000	30,000
SUBTOTAL	$4,950,000	$1,494,000
ENGINEERING AND DESIGN	396,000	7,000
SUPERVISION AND ADMINISTRATION	297,000	5,000
TOTAL FIRST COSTS	$5,643,000	$1,506,000

ANNUAL COSTS

8. Estimates of annual costs are based on a 100-year period of analysis and include interest during construction. Interest and amortization charges are based on an interest rate of 6-1/8 percent. The estimated cost of operation, maintenance, and major replacements is also included. Table F-2 summaries the estimated annual costs.

Table F-2

ESTIMATED ANNUAL COSTS

	Federal	Non-Federal
Interest and Amortization on First Costs	$367,762	$ 98,148
Levee Maintenance		2,400
Pump Plants Energy and Demand		10,350
Pump Plant Operation and Maintenance		4,800
Pump Plant Replacement		6,507
Loss of Productivity (Rights-of-Way and Ponding Area)		5,500
TOTAL ANNUAL CHARGES	$367,762	$127,705
TOTAL FEDERAL AND NON-FEDERAL ANNUAL CHARGES	$495,467	

DAMAGE

9. Losses in the flood plain were designated by classes and types of damages and were developed in accordance with terminology contained in paragraph 1-72, EM 1120-2-101, Survey Investigations and Reports, General Procedure.

TYPES OF FLOOD DAMAGE

10. Tangible damages included physical damage caused by inundation, flood emergency losses or costs incurred in fighting or preparing for flooding, and business or other financial losses resulting from decreased production, loss of profits and wages, and increased cost of normal operations and living.

11. Residential damages include inundation losses to all residences and appurtenant residential structures and damages to grounds. Cost of emergency quarters due to flooding is also included. Personal property and contents within residences were further separated from damages to residential structures.

12. Commercial damages include losses to all properties used in commerce, business, trade, servicing, or entertainment as distinguished from other properties used in industry, public administration, utility production and service, and transportation. Physical flood damages to commercial property and facilities include damages

to land, buildings, equipment, supplies, merchandise, and other items used in the conduct of businesses.

13. Industrial damages include inundation losses and destruction to industrial and public utilities properties. Facilities used in extracting, producing, manufacturing, and processing of commodities and heavy warehousing and those involved in distribution are generally classified as industrial. Business losses to industry are essentially the same as those listed above for commercial establishments.

14. Public facilities damages include inundation losses to public buildings, roads and bridges, streets, pavement, sidewalks, highway structures, parks, and other facilities, including equipment and furnishings owned or operated by Federal, State, county, or local government units.

15. Public business emergency losses, considered as public facilities damages, include losses due to increased cost of normal operations. Other losses to the public include the additional costs incurred during flood emergencies such as evacuation and reoccupation, flood fighting, disaster relief, and extra duty for police, fire, and Military units.

DATA COLLECTION

16. The most recent field survey of the flood plain was made by the Corps of Engineers in 1975 to determine damage curves for the

various categories of development--industrial, commercial, residential, public, and utilities. Surveys were made of areas that would be subject to damage in the event of the occurrence of the Standard Project Flood. Information gathered from previous flooding, was also used to develop curves depicting how flood damage would vary for corresponding elevations of floodwaters. The field survey of damage potential included personal interviews with representatives of business establishments to aid in the derivation of damage curves and to help determine a basis of business expansion. With the aid of topographic mapping of the problem areas and computed high water profile data, the developed property in the flood plain was tabulated by location, nature of occupancy, floor elevation, elevation of zero damage, approximate building dimensions and type of structure. Estimates of damage were made for each one-half foot interval of flood depth for each developed property. Flood damage potential for each property at the various elevations include these factors:

- Flood fighting or evacuation costs.
- Property damage including the structure and contents.
- Net salary losses sustained as a result of flooding.
- Net loss of income or production due to flooding.
- Cleanup cost following a flood.

DEPTH-DAMAGE RELATIONSHIPS--RESIDENTIAL STRUCTURES

17. Depth versus damage relationships for residential structures were derived from observed damage data obtained subsequent to flood events in the Rock Island District.

DEPTH-DAMAGE RELATIONSHIPS--COMMERCIAL AND INDUSTRIAL

18. The result of damage surveys and personal interviews with property owners and/or their representatives formed the basis of deriving the elevation-damage curve for each business and commercial establishment. These were combined to form a damage curve for each category and for each area under consideration.

DERIVATION OF AVERAGE ANNUAL FLOOD DAMAGES

19. Curves showing flow versus frequencies (probability of annual occurrence) were combined with the stage-damage curves for the various stream reaches studied. An index station was selected for each reach for common reference. The area under each damage frequency curve was computed. In computing average annual damage, each stream was assumed to flood independently, with AAD computed for each and then added together for the total. Coincident floodings were not analyzed because of the low probability of such floods occurring. For areas lying north of the Chicago and Northwestern, zero damage was considered to be two feet below the lowest railroad elevation for the river reach of the Raccoon River being considered. This assumption was made after consideration of the amounts of emergency measures necessary during the 1973 flood to prevent floodwaters from seeping through and eroding away the railroad embankment. This same area is protected from low level floods of Walnut Creek by a temporary type levee paralleling Walnut Creek. Due to uncertainties regarding the reliability of such a levee, zero damage for Walnut Creek floods was likewise considered to be two feet below the lowest levee elevation for reach 3 of Walnut Creek.

AVERAGE ANNUAL DAMAGES FOR EXISTING PROPERTIES

20. The average annual damages under present (1975) conditions are shown in Table F-3.

Table F-3

AVERAGE ANNUAL DAMAGES FOR RACCOON RIVER, WALNUT AND JORDAN CREEKS (Existing Conditions)

Reach	Location	Residential	Commercial	Industrial	Public and Utilities	Total
		WALNUT CREEK				
1	N. City Limits to Grand Ave.	5,100	237,000	13,000	3,900	259,000
2	Grand Ave. to Vine St. Extended	800	100	-	-	900
3	Vine St. to Mouth	17,800	5,200	1,500	2,500	27,000
TOTAL		23,700	242,300	14,500	6,400	286,900
		RACCOON RIVER				
4	Walnut Creek to 63rd St.	68,300	-	-	1,300	69,600
5	63rd St. to Industrial Park	221,400	113,400	62,800	28,900	426,500
6	Industrial Park to Jordan Creek	-	300	13,900	-	14,200
TOTAL		289,700	113,700	76,700	30,200	510,300
		JORDAN CREEK				
7	Mouth to C.R.I.&P. RR	-	300	3,700	-	4,000
8	C.R.I.&P. RR to Fuller Dr.	-	-	2,100	-	2,100
TOTAL		-	300	5,800	-	6,100

21. Property damage consists of a total of the various categories as listed in paragraph F-16. Amounts of damage for each are listed in table F-4. Values given represent the best estimate of damage should the 200-year flood occur.

Table F-4

DAMAGE BY CATEGORY (200-YEAR FLOOD)

Type of Property	Damages in Percentage of Total			
	Physical Damage	Emergency Costs	Lost Employment	Lost Profit
Industrial	79	3	4	14
Commercial	85	4	2	9

DERIVATION OF AVERAGE ANNUAL FLOOD DAMAGE, FUTURE CONDITIONS

22. The city of West Des Moines is located adjacent to Des Moines, Iowa's capital city in central Iowa. Interstate 80 passes through the city, connecting West Des Moines with Chicago, which is 339 miles to the east, and Omaha and Denver to the west, which are 140 and 675 miles, respectively. Interstate 35 also passes through West Des Moines and connects the city with Minneapolis and St. Paul, 256 miles to the north, and Kansas City, which is 206 miles to the south. A through-town interstate highway, I-235, also passes through West Des Moines, providing access to the entire Des Moines metropolitan area. Rail service is provided to West Des Moines by the Rock Island Lines, Milwaukee Road, and the Chicago and Northwestern Railway Company. Through the Des Moines Airport, three airlines, United, Braniff, and Ozark, provide air transportation.

23. As a result of its location and railroad transportation service, West Des Moines has experienced rapid growth. The 1970 US Census showed a population increase from 11,949 in 1960 to a 1970 population of 16,441 or approximately 38 percent. Polk County showed an increase in population of 15,163. Therefore, West Des Moines accounted for approximately 28 percent of the total county's growth during the period. It appears reasonable to assume that similar growth will extend into the future, and affect the flood damage of the flood plain. From interviews conducted in the flood plain, it was assumed that future growth of the flood plain would occur as rapidly as, and probably even more rapidly, than that which would be experienced by the general metropolitan area.

24. The study of the effects of future growth considered two categories of growth under "without project" conditions. One category is the anticipated growth expected for existing residential, public, commercial, and industrial activity of the flood plain. The other category is the growth anticipated for available unoccupied areas of the flood plain. Of this last category, there are many areas available that are above the level of the 100-year flood. These are the areas that will develop before the lower flood plain areas can be considered. Therefore, future growth into available unoccupied areas was not analyzed. The future growth analysis contained herein is concerned with increased future activity for existing units.

25. The Selection of Growth Indices. To derive future growth allowances to be added to flood damage, it is assumed that future growth would proceed with or without the proposed project operating. To estimate future growth, projections for the residential,

commercial, industrial, and public are needed, each sector to be represented by an appropriate index. Base year is 1982--the earliest that the project can be completed.

26. Residential and Public Sector. Per capita income was considered as a possible growth index for these sectors because it reflects family purchasing power and the qualitative need for housing, and it adjusts for variations in family size and expenditures. Per capita income as represented by OBERS projections for SMSA 061 Des Moines is listed in table F-5.

Table F-5

PER CAPITA INCOME (1967 $)
(in $1,000)

1950	1962	1969	1970	1971	1980	1985	1990	2000	2020
2.6	3.0	3.7	3.9	3.9	5.3	5.9	6.7	8.8	14.1

27. The per capita income increase represented in table F-5 for OBERS SMSA 061 Des Moines is approximately 2.1 percent compounded annually for the years 1980 to 2020. However, there are limitations to the application to residential properties. Nationally, the increase in real unit value of residences has not been a major growth factor over the past 20 years. However, the real value of household contents has increased at a rate slightly higher than the real income per household. Accordingly, the 2.1 percent annual rate may be projected to a maximum of 75 percent of the value of the structure and the projected period of increase is to be limited to the first 50 years of project life. For table F-7, the projected time of growth is 38 years. Allowing the 75 percent maximum increase over 38 years gives the equivalent of 0.81 percent rate compounded annually.

28. Industrial and Commercial Sectors. An attempt was made to base future growth considerations upon personal interviews. The response received was not considered a realistic representation of growth trends, past or future. Most businesses interviewed would not give good indication of past growth and were indefinite about future plans. Of the total number of businesses interviewed only about 10 percent responded positively. Business growth estimates ranged from 5 to 15 percent per year. In general, the younger plants already have fairly modern equipment and would expand the size of their physical plant. Many of the older businesses need to modernize present facilities. Even if modernization were not in their present plans, the pressures of future economic trends from an increasing population would require modernization of facilities in order to compete with other firms. Modernization would, in general, generate increased business activity. Therefore, it is considered conservative to assume 5 percent yearly increase in business activity to all businesses excepting those indicating greater rates. Adding these together and computing an average, it was estimated that the trend for businesses of the protected area would be at an approximate 5.4 percent rate of growth. The impacts of the Flood Insurance Act were considered in estimating future growth.

29. Commercial and industrial income as represented by OBERS projections for SMSA 061 is listed as follows:

Table F-6

COMMERCIAL AND INDUSTRIAL INCOME

1950	1962	1969	1970	1971	1980	1985	1990	2000	2020
RETAIL TRADE (Income in $1,000)									
127.6	164.1	196.6	202.8	202.4	287.8	320.9	357.9	467.3	762.3
MANUFACTURING (Income in $1,000)									
112.9	161.4	223.5	218.1	224.3	321.1	372.7	432.6	577.8	953.7

30. The annual income increase represented by table F-6 is approximately 1.9 percent for commercial and 2.2 percent for industrial activity for the years 1980 to 2020. These rates are substantially lower than those estimated in the preceding paragraph for the protected area.

31. OCE and NCD guidelines have stressed the importance of omitting the effects of affluence in commercial and industrial growth computations. From the results of the foregoing analysis of trends for the protected area as compared to the SMSA area, a 2 percent growth rate was selected; such a rate being considered low enough to have omitted the effects of affluence. This rate was applied to the derivation of future growth for the industrial and commercial sectors as shown in table F-7. Future growth for the public sector was assumed to be represented by earnings in civil government, transportation, communication, and public utilities. The OBERS rate of growth for these categories was indicated to be 2.8 percent. Therefore, an .81 percent rate was considered to be conservative enough to omit affluence.

Table F-7

FUTURE AVERAGE ANNUAL DAMAGE--EXISTING UNITS

Category	Avg Annual Damage (1975)	Annual Compound Growth Rate (1975-2020)	Base Year Annual Damage (1982)	Annual Damage (2020-2082) 1/	Equivalent Annual Damage Over 100-Year Project Life
Residential	$313,400	.81	$331,577	$451,076	$ 376,900
Commercial	356,300	2.00	409,389	868,623	573,100
Industrial	97,000	2.00	111,453	236,476	155,900
Public	36,600	.81	38,772	52,678	45,900
TOTAL	$803,300				$1,151,800

1/ Annual damage assumed constant after 2020 because projections are uncertain beyond this year. Discount rate = 6-1/8 percent.

32. Growth without the project, which would result from expansion into unoccupied areas of the flood plain, was also studied. Plate F-1 indicates present land usage. Flood plain areas for commercial expansion are not as desirable as those at higher levels and are therefore not studied under "without project" conditions. An industrial park area is available for the location of new industries; however, 80 percent of the land is above the 200-year flood level. Accordingly, increases in average annual damage resulting from industry locating there in the future would be insignificant. Because of the Flood Insurance Act, industry would not locate in areas lower than the 100-year flood level.

33. Table F-8 provides a breakdown of average annual damage, ultimate conditions, by stream, reach, and category.

Table F-8

AVERAGE ANNUAL DAMAGES FOR RACCOON RIVER, WALNUT AND JORDAN CREEKS

(Ultimate Conditions and 1975 Prices)

Reach	Location	Residential	Commercial	Industrial	Public and Utilities	Total
			WALNUT CREEK			
1	N. City Limits to Grand Ave.	$ 6,100	$381,200	$ 20,900	$ 7,300	$415,500
2	Grand Ave. to Vine St. Extended	1,000	200	-	-	1,200
3	Vine St. to Mouth	21,400	8,300	2,400	2,200	34,300
	TOTAL	$ 28,500	$389,700	$ 23,300	$ 9,500	$451,000
			RACCOON RIVER			
4	Walnut Creek to 63rd St.	82,100	-	-	1,600	83,700
5	63rd St. to Industrial Park	266,300	182,400	101,000	34,800	584,500
6	Industrial Park to Jordan Creek	-	500	22,300	-	22,800
	TOTAL	$348,400	$182,900	$123,300	$36,400	$691,000
			JORDAN CREEK			
7	Mouth to C.R.I.&P. RR	-	500	5,900	-	6,400
8	C.R.I.&P. RR to Fuller Dr.	-	-	3,400	-	3,400
	TOTAL	-	$ 500	$ 9,300	-	$ 9,800

34. Floodway zoning is in the process of being established for the protected area. The impact of the Flood Insurance Act upon future growth was considered in deriving average annual damage, ultimate conditions.

BENEFITS

35. Estimates of monetary benefits are based on the March 1975 price level and 1982 conditions of development. The projected 1982 economic conditions were selected as base year for the study because 1982 is the most probable date for completion of the recommended project, if

such action is realized. Projections of future growth in the flood plain with or without protective works were not estimated beyond the year 2020. This is as far into the future that projections are considered to be reliable. Prediction of land enhancement of flood plain lands are based upon increases in amounts, or levels, of usage anticipated for the lands with the project works in operation. All benefits evaluated have been classified and are discussed in more detail in subsequent paragraphs.

FLOOD CONTROL BENEFITS

36. Flood control benefits from the project were estimated by evaluating damages with and without the proposed project and under existing and future development conditions. Future development expected to occur in the area subject to damage was projected over the life of the proposed works.

37. Primary tangible flood damage reduction benefits for the plan of improvement are the differences between the equivalent average annual flood losses without the project and residual average annual losses with the project. Table F-9 shows the distribution of existing land use in the flood plain for the recommended plan of improvement.

Table F-9

EXISTING LAND USE DISTRIBUTION
(Within the Protected Area)

	Area	No. of Units
Residential	200 acres	922
Commercial	120 acres	143
Industrial	175 acres	22
Public	232 acres	14
Resource & Undeveloped	100 acres	-
Parks & Recreation	100 acres	-
TOTAL	927 acres	

38. Although the population of West Des Moines is projected to increase from 16,441 in 1970 to 28,000 in 2020, most of this increase would be in available areas having land elevations higher than those typical of the flood plain. Such unoccupied areas zoned residentially are in the western parts of the city. The 1970 population of 16,441, for the city of West Des Moines, occupies an area of approximately 2,520 acres which is a density of approximately 7.2 people per acre.

DERIVATION OF AVERAGE ANNUAL FLOOD CONTROL BENEFITS

39. The selected plan offers a 200-year level of protection against the flooding of the Raccoon River and Walnut and Jordan Creeks. The difference in flood damage without and with the selected project is evaluated as benefits. Table F-10 shows benefits accruing to the proposed plan, under existing development conditions over a 100-year project life.

Table F-10

AVERAGE ANNUAL DAMAGES AND BENEFITS

Stream	Average Annual Damages Without Project Conditions	With Project Conditions	Average Annual Benefits Flood Damage Reduction
Walnut Creek	$286,900	$20,800	$266,100
Raccoon River	510,300	1,200	509,100
Jordan Creek	6,100	1,700	4,400

FUTURE BENEFITS--WITHOUT PROJECT

40. Future benefits from economic trends not induced by the project are expected to occur. The methods used to estimate the future average annual damages are also used to estimate future benefits in this category. Similar to the computation of the future average annual damages, as shown on table F-7, future average annual benefits (using existing units and "without project" trends) were computed. The results are shown on table F-11.

Table F-11

FUTURE AVERAGE ANNUAL BENEFITS--EXISTING UNITS (Without Project)

Category	Avg Annual Benefit (1975)	Annual Compound Growth Rate (1975-2020)	Base Year Annual Benefit (1982)	Annual Benefit (2020-2082) 1/	Equivalent Annual Benefit Over 100-Year Project Life
Residential	$293,000	.81	$309,997	$ 421,205	$ 352,400
Commercial	357,000	2.00	410,193	870,552	574,000
Industrial	94,000	2.00	108,006	229,221	151,100
Public	35,600	.81	37,665	51,177	42,800
TOTAL	$779,600		$865,861	$1,572,154	$1,120,300

1/ Annual benefits are assumed constant after 2020 because projections are uncertain beyond this year.

41. Future growth benefits from trends to expand into available unoccupied areas were not included, as it was considered that this type of growth would not occur for flood plain areas. As explained for the derivation of average annual damages, the availability of such areas at higher elevations, and also the impacts of the flood insurance act, would tend to restrict future expansion into flood plain areas.

42. Table F-12 lists flood control benefits by decade.

Table F-12

FLOOD CONTROL BENEFITS BY DECADE
(Project Life = 100 Years)
(Benefits by Decade)

YEAR	COMMERCI	INDUSTRI	RESIDENT	PUBLIC	OTHER	TOTAL
1982	410193	108006	309997	37665	48600	914461
1990	480606	126546	330664	40176	48600	1026592
2000	585857	154259	358445	43551	48600	1190712
2010	714156	188041	388560	47211	48600	1386568
2020	870552	229221	421206	51177	48600	1620756
2030	870552	229221	421206	51177	48600	1620756
2040	870552	229221	421206	51177	48600	1620756
2050	870552	229221	421206	51177	48600	1620756
2060	870552	229221	421206	51177	48600	1620756
2070	870552	229221	421206	51177	48600	1620756
2080	870552	229221	421206	51177	48600	1620756

43. Table F-13 lists pertinent data regarding benefits and cost for incremental increases in discount rate from 6-1/8 percent to 10 percent.

Table F-13

SENSITIVITY OF BENEFITS AND COST TO INCREASES OF DISCOUNT RATE

DISCOUNT RATE	PRESENT WORTH OF ALL BENEFITS	PRESENT WORTH OF ALL COSTS	NET BENEFITS	AVERAGE ANNUAL BENEFITS	AVERAGE ANNUAL COSTS	NET ANNUAL BENEFITS	YEAR WHEN BENEFITS (UNDISCOUNTED) EXCEED COST	YEAR WHEN BENEFITS (DISCOUNTED) EXCEED COST	BENEFITS TO COST RATIO
%	1000's	1000's	1000's	1000's	1000's	1000's			
5.875	19971	8076	11896	1177	476	701	8	9	2.47
6.000	19494	8072	11422	1173	486	687	8	10	2.42
6.125	19037	8068	10969	1169	495	674	8	10	2.36
6.250	18598	8065	10533	1165	505	660	8	10	2.31
6.375	18178	8063	10116	1161	515	646	8	10	2.25
6.500	17775	8061	9714	1158	525	633	8	10	2.21
6.625	17388	8059	9329	1154	535	619	8	10	2.16
6.750	17016	8058	8958	1150	545	606	8	10	2.11
6.875	16658	8057	8601	1147	555	592	8	10	2.07
7.000	16314	8057	8258	1143	565	579	8	10	2.02
7.125	15984	8057	7927	1140	575	565	8	10	1.98
7.250	15665	8057	7608	1137	585	552	8	10	1.94
7.375	15358	8058	7300	1134	595	539	8	10	1.91
7.500	15062	8059	7003	1130	605	526	8	10	1.87
7.625	14776	8060	6717	1127	615	512	8	10	1.83
7.750	14501	8061	6440	1124	625	499	8	10	1.80
7.875	14235	8063	6172	1122	635	486	8	10	1.77
8.000	13978	8065	5913	1119	646	473	8	10	1.73
8.125	13730	8067	5662	1116	656	460	8	10	1.70
8.250	13489	8070	5420	1113	666	447	8	10	1.67
8.375	13257	8073	5185	1111	676	434	8	10	1.64
8.500	13032	8075	4957	1108	687	421	8	11	1.61
8.625	12815	8079	4736	1106	697	409	8	11	1.59
8.750	12604	8082	4522	1103	707	396	8	11	1.56
8.875	12400	8085	4314	1101	718	383	8	11	1.53
9.000	12202	8089	4113	1098	728	370	8	11	1.51
9.125	12010	8093	3917	1096	739	357	8	11	1.48
9.250	11823	8097	3726	1094	749	345	8	11	1.46
9.375	11642	8101	3541	1092	760	332	8	11	1.44
9.500	11467	8105	3361	1089	770	319	8	11	1.41
9.625	11296	8110	3186	1087	781	307	8	11	1.39
9.750	11130	8114	3016	1085	791	294	8	11	1.37
9.875	10969	8119	2850	1083	802	281	8	11	1.35
10.000	10812	8124	2688	1081	812	269	8	11	1.33

INTERNAL RATE OF RETURN: 12.700 %

44. Future expansion in addition to that computed for existing units (as shown by table F-9) is often analyzed. In the case of the selected project, future expansion of the various land uses into unoccupied areas of the flood plain is not anticipated. There are more desirable unoccupied areas in areas at higher elevations than flood plain levels. The Flood Insurance Act is also a major factor in discouraging new residential, commercial, and industrial establishments from locating in the flood plain under "without project" conditions. Accordingly, future benefits of this type were not analyzed.

FUTURE BENEFITS--WITH PROJECT

45. Future benefits are considered to be induced by the project. A number of flood plain areas will probably be enhanced by implementing the selected plan. The areas lie below the 50-year level of flooding and at present remain at present use because of the flood hazard and also the restrictive nature of the Flood Insurance Act. Land enhancement "fill" benefits cannot be considered for any of the areas because of the availability of other higher areas. Land enhancement induced by the project being placed into operation would be the result of new development that would locate in the area and increase the productivity of its use. The areas are further described in paragraphs that follow.

46. Area No. 1 is located in Reach 6, south of the C.R.I.&P. Railroad, and presently zoned industrial. The area is lower than the 50-year level of flooding of the Raccoon River. Part of the area

will be used as project ponding. The remaining 20 acres remains unoccupied and does not attract new industry because of the flood hazard and also the "fill" requirements of the Flood Insurance Act. Flood protection would remove most of the hazard and is considered to make the area attractive to new industry with accompanying increases in land values and productivity.

47. Area No. 2 is located in Reach 4, in the city of Des Moines, south of the C.R.I.&P. Railroad, just east of 63rd Street. It is presently zoned as a flood plain district. However, this will very likely be changed when the area is protected. The area is lower than the 50-year flood. Approximately 10 acres of the area remains unoccupied because of the flood hazard.

48. Area No. 3 is located in Reach 3, along about 3,000 feet of right bank Walnut Creek from its mouth upstream. It is also presently zoned as a flood plain district, but would serve for residential expansion if the flood hazard were removed.

49. Area No. 4 is the West Des Moines downtown area bounded by Walnut and Maple Streets on the north and 14th and Ninth Streets on the west and 13th Street on the east. The present use of the area is haphazard, residential interspersed with commercial and light-industrial usage. The city was ready to initiate a redevelopment program for the area. The program lost momentum because of the Flood Insurance Act. At present redevelopment is too costly

because of the "fill" requirements of the act. Assuming that flood protection would remove this requirement, the city could redevelop the area with resulting increased land values and productivity. Because of the lack of a good basis for estimating increases of productivity, land enhancement is not analyzed for the area; however, the effects that flood protection has upon the productivity of the downtown area should be taken into consideration.

50. Table F-14 lists evaluations for the first three areas as follows:

Table F-14

EVALUATIONS FOR THE FIRST THREE AREAS

Area	Size	Estimated Value Existing Conditions	Estimated Value With Project Conditions
1	20 acres	$26,800	$ 97,500
2	10 acres	6,000	30,000
3	30 acres	20,000	150,000
TOTAL	60 acres	$52,800	$277,500
	INCREASED VALUE	$224,700	

51. Annual land enhancement benefits were computed by assuming that the enhancement results from removing flooding problems and that the economic pressures which cause industrial development would have little effect until flooding problems were effectively reduced. It was assumed that the enhancement would occur over a 20-year period for the enhanced areas. Using an interest rate of 6-1/8 percent for computing present worth and capital recovery over the project life, the equivalent uniform annual increase in benefits was found to total $12,500.

RECREATION BENEFITS

52. Recreation benefits for the recreation facilities proposed for the project were considered to accrue in accordance with the schedule presented earlier in this report. Benefits were derived from a consideration of the value to a visitor given through use of bicycle trails, boat launching areas, and park grounds. Full use of these facilities was assumed to occur for the first year of project operation resulting in $36,100 of annual recreation benefits.

SUMMARY OF BENEFITS

53. Benefits from flood damage reduction, future growth increases (without project), and land enhancement (with project) are summarized in table F-15.

Table F-15

SUMMARY OF ESTIMATED ANNUAL BENEFITS, ESTIMATED ANNUAL COSTS, AND B/C RATIOS

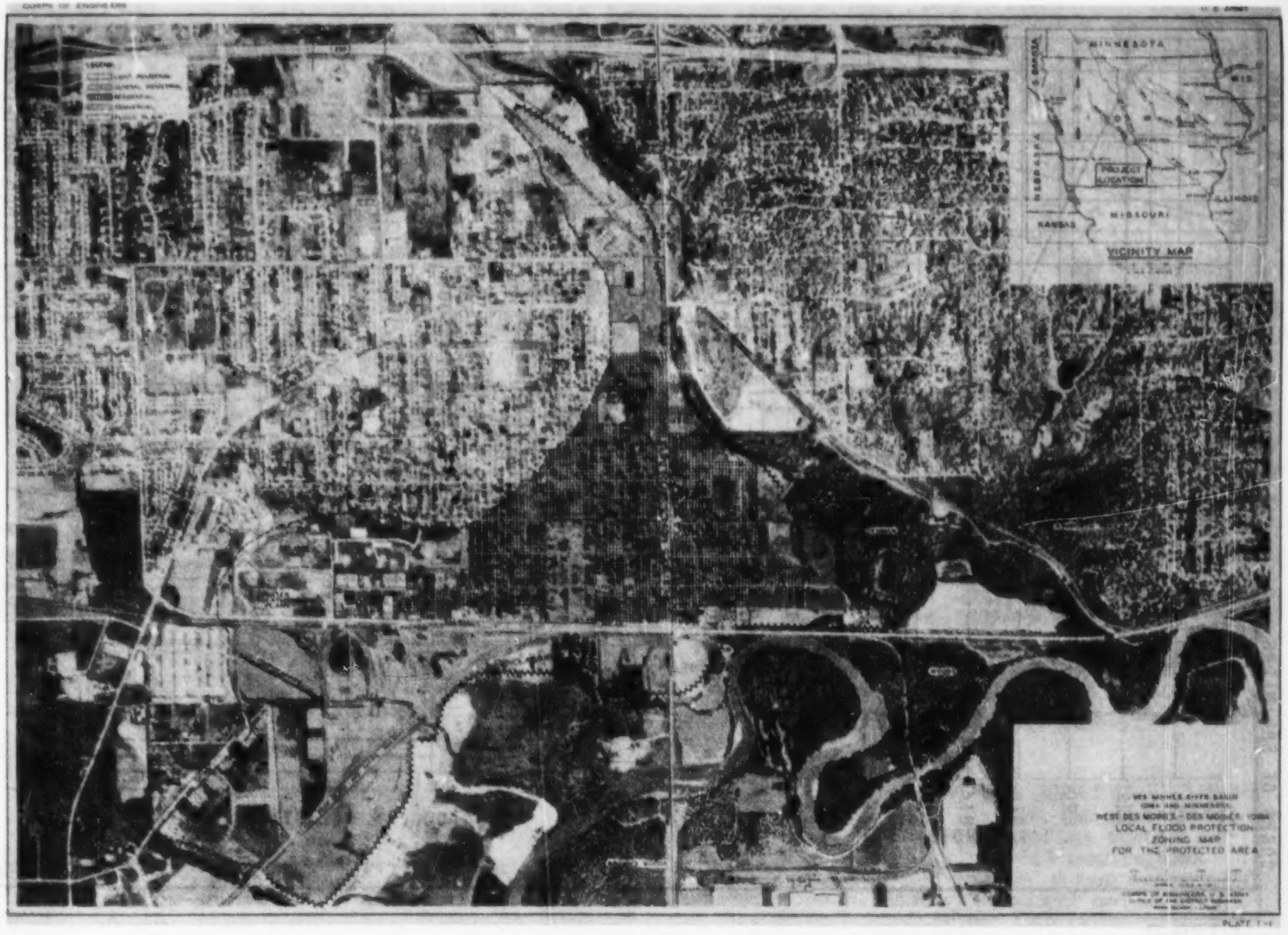
Type	Walnut Creek	Raccoon River (Incl. Jordan Creek)	Total
Recreation			$ 36,100
Annual Costs			19,300
B/C Ratio			1.87
Flood Damage Reduction (Existing Conditions)	$266,100	$513,500	779,600
Recreation			36,100
Annual Costs (Incl Recreation)			495,467
B/C Ratio			1.65
Increase to Base Year			86,300
Future Growth Increase			254,400
Land Enhancement			12,500
TOTAL			$1,168,900
BENEFITS-TO-COST RATIO			2.36

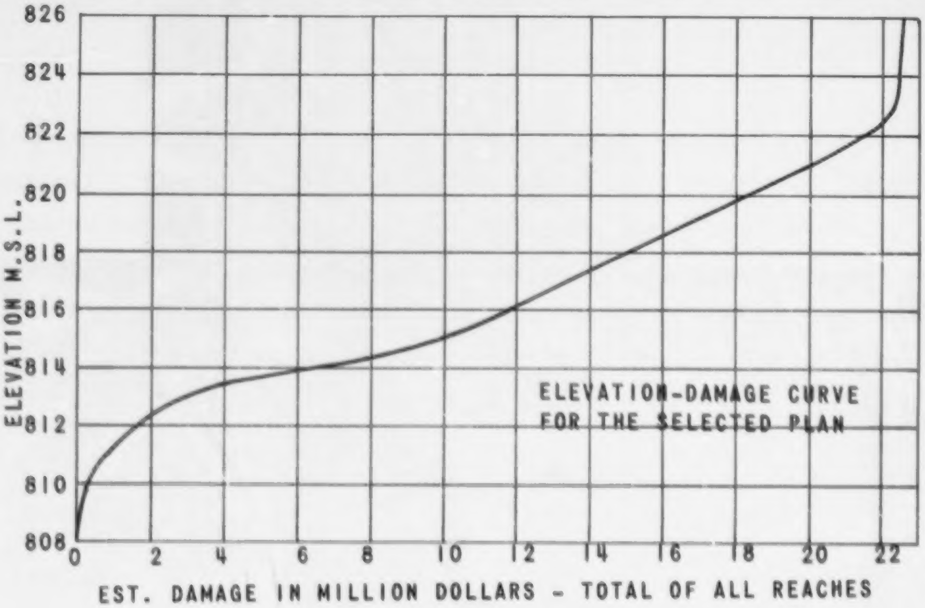
54. Optimizing tangible benefits is a method of scaling a project to the point where the greatest excess of benefits over costs occurs. In this method, the last increment in project size should produce an incremental benefit-cost ratio equal to 1.0 and further increases in project size would be uneconomical. Project size could be increased for environmental or social reasons, however. Table F-16 lists values of annual benefits and charges used to derive the curves on plate F-3.

Table F-16

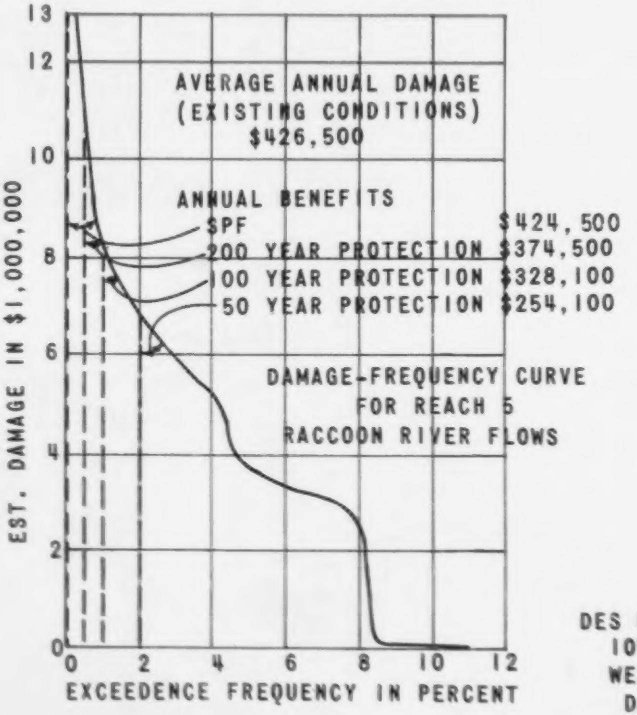
PROJECT OPTIMIZATION DATA
(Flood Control Only)

Level	Annual Cost	Annual Benefits	B/C	Incremental			Excess Benefit	Discharge
				Costs	Benefit	B/C		
50 Year	332,300	542,700	1.63				207,700	50,000
				6,100	26,800	4.43		
	338,900	569,500	1.68				230,600	52,500
				6,300	27,500	4.36		
	345,200	597,000	1.73				251,800	55,000
				6,400	26,800	4.18		
	351,600	623,800	1.77				272,200	57,500
				6,200	23,600	3.83		
100 Year	357,800	647,400	1.81				289,600	59,700
				6,800	26,100	3.83		
	364,600	673,500	1.85				308,900	62,500
				6,800	16,500	2.43		
	371,400	690,000	1.86				318,600	65,000
				6,500	13,200	2.04		
	377,900	703,200	1.86				325.300	67,500
				7,100	13,900	1.95		
200 Year	385,000	717,100	1.86				332,100	70,600
				22,000	14,900	0.72		
	407,000	732,000	1.79				325,000	94,700
				35,800	25,800	0.72		
	442,800	757,800	1.71				315,000	118,900
				33,400	21,800	0.65		
SPF	476,200	779,600	1.64				303,400	143,000


CORPS OF ENGINEERS
U. S. ARMY
LEGEND
MINNESOTA
S. DAKOTA
WIS.
NEBRASKA
PROJECT LOCATION
ILLINOIS
KANSAS
MISSOURI
VICINITY MAP
DES MOINES RIVER BASIN
IOWA AND MINNESOTA
WEST DES MOINES – DES MOINES, IOWA
LOCAL FLOOD PROTECTION
ZONING MAP
FOR THE PROTECTED AREA
CORPS OF ENGINEERS, U. S. ARMY
PLATE I-1



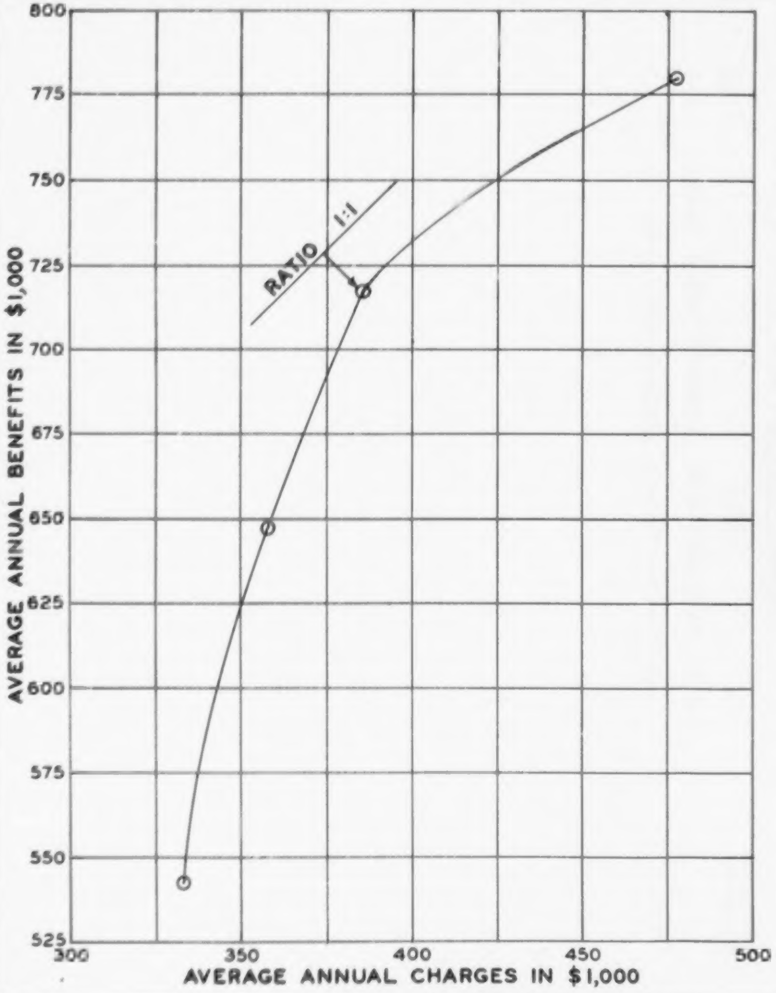
GRAPH A

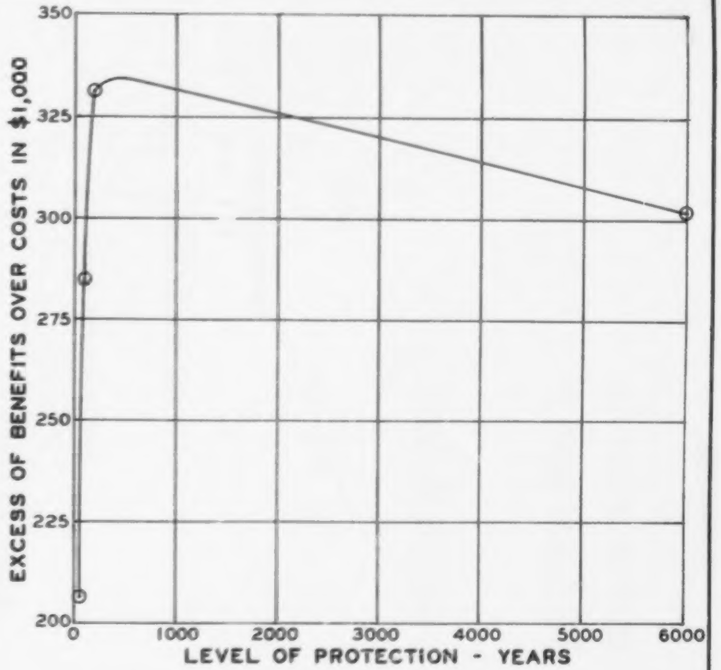


GRAPH B

DES MOINES RIVER BASIN
IOWA AND MINNESOTA
WEST DES MOINES AND
DES MOINES, IOWA
LOCAL FLOOD PROTECTION
GRAPHS-ECONOMIC ANALYSIS

PLATE F-2





RELATIONSHIP BETWEEN BENEFITS AND COSTS
(EXISTING CONDITIONS)
FOR VARYING SCALES OF DEVELOPMENT

DES MOINES RIVER BASIN
IOWA AND MINNESOTA
WEST DES MOINES AND
DES MOINES, IOWA
LOCAL FLOOD PROTECTION
PROJECT OPTIMIZATION

PLATE F-3

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SECTION G

DIVISION OF PLAN RESPONSIBILITIES

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SECTION G

DIVISION OF PLAN RESPONSIBILITIES

1. This section of the report defines the responsibilities for the selected plan. The responsibilities are summarized as Federal and non-Federal. The non-Federal responsibilities are shared by the city of Des Moines and the city of West Des Moines.

COST APPORTIONMENT

2. Cost apportionment between Federal and non-Federal interests for the selected plan is established by Federal policy. The Federal cost includes planning, design, and construction of the plan. The non-Federal costs consist of lands, easements, rights-of-way, relocation of utilities, acquisition of borrow material, and the operation and maintenance of the completed project. A summary of financial responsibilities is listed below.

Table G-1

COST APPORTIONMENT
THE SELECTED PLAN (STANDARD PROJECT FLOOD PROTECTION)

	First Cost	Avg Ann Cost
Federal	$5,643,000	$367,762
Non-Federal	1,506,000	127,705
TOTAL	$7,149,000	$495,467

Table G-2

NON-FEDERAL RESPONSIBILITIES
THE SELECTED PLAN (STANDARD PROJECT FLOOD PROTECTION)

First Cost	West Des Moines	Des Moines
Rights-of-way 1/	$ 725,000	$268,000
Borrow 2/	268,000	143,000
Relocations	51,000	17,000
Recreation Facilities 3/	0	34,000
TOTAL FIRST COST	$1,044,000	$462,000
Annual Cost		
Levee Maintenance	$ 1,500	$ 900
Pump Plant Energy and Demand	10,350	
Pump Plant Operation and Maintenance	4,800	
Pump Plant Replacement	6,507	
Loss of Productivity	3,400	2,100
TOTAL ANNUAL COST	$26,557	$3,000

1/ Includes lands acquired for ponding areas, recreation lands, other lands, damages, and acquisition costs.

2/ Includes lands acquired for borrow material in addition to material acquired from ponding areas.

3/ Recreation lands, damages, and facilities are to be cost shared--50% Federal Government and 50% Non-Federal sponsor. All lands and damages are a Non-Federal responsibility. The cost sharing recreation first costs excluding engineering and design and supervision and administration costs are:

West Des Moines

Lands and Damages	$130,000
Facilities	38,000
TOTAL	$168,000

50-50 Cost Share	Federal Government	West Des Moines
Lands and Damages	$ 0	$130,000
Facilities	38,000	0
TOTAL	$ 38,000	$130,000

Des Moines

Lands and Damages	$ 25,000
Facilities	85,000
TOTAL	$110,000

50-50 Cost Share	Federal Government	Des Moines
Lands and Damages	$ 0	$ 25,000
Facilities	55,000	30,000
TOTAL	$ 55,000	$ 55,000

FEDERAL RESPONSIBILITIES

3. The Federal Government will design and construct the various features of the protection works. The work generally charged as a Federal cost includes that for levees, floodwalls, ramps, and utility lines through, over, or beneath levees and floodwalls.

NON-FEDERAL RESPONSIBILITIES

4. The basic non-Federal responsibilities include providing lands and rights-of-way, paying for relocations and alterations, holding the United States free from damages, and maintaining and operating the completed project.

5. A more definitive and complete specification of non-Federal responsibilities will be the terms of a negotiated agreement between the Federal Government and local sponsors. The city of Des Moines and the city of West Des Moines will share local responsibilities.

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APPENDIX 2

PERTINENT CORRESPONDENCE

APPENDIX 2

PERTINENT CORRESPONDENCE

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APPENDIX 2

PERTINENT CORRESPONDENCE

Because of the extended duration of this survey report, Appendix 2, Pertinent Correspondence contains two parts. The first part concerns correspondence dated from 1965 through 1970 and is summarized in table 2-1. The complete correspondence is available at the Rock Island District office for inspection. Because of policy changes and public attitude variations, these letters are judged historical and not valid for decision making in 1975. The second part contains copies of all letters the Rock Island District has received since 1 January 1971 which are considered germane to the current decision making process.

SUMMARY CORRESPONDENCE FROM 1965 THROUGH 1970

Table 2-1

Date	Author	Subject	Comment Summary
11 Jan 1965	Soil Conservation Service	Jefferson Reservoir	Inadvisable to recommend storage for irrigation.
11 Mar 1965	Bureau of Sport Fisheries & Wildlife	Jefferson Reservoir	Recommended features and project modifications to preserve and enhance fish and wildlife values.
26 Mar 1965	Dept of Health, Education & Welfare	Jefferson and Walnut Creek Reservoirs	Investigation of need for municipal and industrial water supply. Estimate of value of water quality storage.
5 Apr 1965	Bureau of Outdoor Recreation	Recreation Potential of Jefferson Reservoir	Consider recreation as a primary project purpose. Provide basic facilities initially.
20 Apr 1965	State Conservation Commission	Walnut Creek Reservoir	Because of previous committments, this agency will probably not participate in project development.
12 May 1965	Bureau of Outdoor Recreation	Recreation Potential of Walnut Creek Reservoir	Reservoir site suitable for day-use activities. Provide basic facilities.
17 May 1965	Bureau of Outdoor Recreation	Whitebreast Creek Reservoir	Stated an interest in recreation as a project purpose and recommended basic facilities. Recreation potential is minimal.

Table 2-1 (Cont'd)

Date	Author	Subject	Comment Summary
7 Sep 1965	Bureau of Sport Fisheries & Wildlife	Walnut Creek Reservoir	Recommended features and project modification to preserve and enhance fish and wildlife values.
1 Nov 1965	Bureau of Sport Fisheries & Wildlife	Whitebreast Creek Reservoir	Stated interest in fish and wildlife as a project purpose and made recommendations to insure wise development.
15 Dec 1965	State Conservation Commission	Jefferson Reservoir	Indicated interest in fish and wildlife development pending further detailed studies.
18 Jul 1966	Dallas County Conservation Board	Walnut Creek	Conservation Board passed resolution indicating interest and participation in recreational development.
29 Jul 1966	Federal Power Commission	Walnut Creek Reservoir	Inadvisable to consider hydropower storage.
19 Sep 1966	Bureau of Sport Fisheries & Wildlife	Fourmile Creek Project	This project offers no feasible opportunities for fish and wildlife enhancement and conversely will produce no damaging effects.
20 Sep 1966	Bureau of Sport Fisheries & Wildlife	West Des Moines-Des Moines Project	This project provides no feasible opportunities for fish and wildlife enhancement. No damage to fish and wildlife is anticipated.

Table 2-1 (Cont'd)

Date	Author	Subject	Comment Summary
26 Sep 1966	Chicago, Milwaukee, St. Paul & Pacific Railroad Company	West Des Moines-Des Moines Project	The railroad indicated no unusual problems involved in proposed track raises.
12 Oct 1966	City of West Des Moines	West Des Moines-Des Moines Project	Statement of city's willingness to cooperate in proposed project.
27 Mar 1969	Federal Water Pollution Control Administration	Des Moines River Basin	Estimates of dilution flows to meet water quality standards at critical locations in Des Moines River Basin.
13 May 1970	Federal Water Pollution Control Administration	Des Moines River Basin	Estimates of annual costs of advanced waste treatment facilities which are the most likely alternatives to flow regulation for meeting water quality standards.
11 Jun 1970	Federal Power Commission	Jefferson Reservoir	Uneconomic feasibility of providing hydroelectric power storage at this proposed site.
20 Oct 1970	City of Des Moines	West Des Moines-Des Moines Project	The city is willing and capable of cooperating in this project.
21 Oct 1970	Dallas County Conservation Board	Walnut Creek Reservoir	Conservation Board outlined development they could support.
30 Oct 1970	Bureau of Sport Fisheries & Wildlife	Des Moines River Basin Report - Proposed Projects	West Des Moines-Des Moines Project and Fourmile Creek Project will have no significant effect on fish and wildlife. Jefferson Reservoir fishery value. Walnut Creek Reservoir fishery value.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

IN REPLY REFER TO
RB

June 2, 1971

Col. James E. Bunch
District Engineer
U. S. Army Engineer District
  Rock Island
Clock Tower Building
Rock Island, Illinois 61201

Dear Col. Bunch:

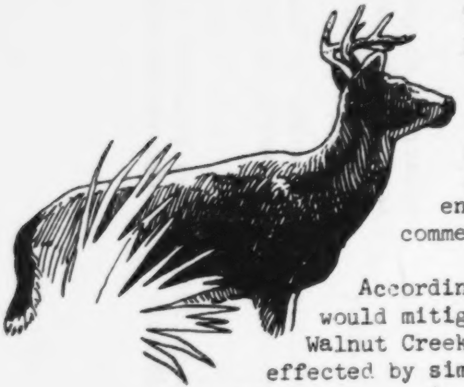
This is in reply to your letter of November 4, 1970, (NCRED-PB) requesting our comments on two project proposals in Iowa, namely the Walnut Creek Environmental Corridor and Des Moines River Environmental Corridor. Both projects are to be incorporated into the pending Des Moines River Basin Report. This letter has been prepared in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.). It supplements our report of October 30, 1970, on the Des Moines River Basin. The Iowa Conservation Commission concurs with our recommendations as indicated in the attached copy of a letter of May 14, 1971, from Mr. Brabham, Director of Planning and Coordination.

The proposed corridors will help prevent commercial encroachment on the flood plain, thus reducing future flood damages. In addition, the preservation of a portion of the Des Moines River flood plain will (1) facilitate reservoir operation, (2) retain fish, wildlife, and aesthetic values, and (3) enhance recreational opportunities in the flood plain.

I. WALNUT CREEK ENVIRONMENTAL CORRIDOR (Polk County, Iowa)

GENERAL DESCRIPTION

The proposed environmental corridor includes approximately 500 acres in a strip of land averaging 320 feet wide on each side of the Creek. The corridor will extend seven miles along Walnut Creek from the Walnut Creek Reservoir downstream to 86th Street in Clive, Iowa. It will include a foot path five feet wide on one bank and an eight-foot wide bike trail on the other bank.



The area is moderately wooded. The understory provides suitable habitat for several species of upland game, white-tailed deer, and numerous species of songbirds. The adjacent lands are either cultivated, grazed, or undergoing urban development. The project would help to preserve the natural state of the corridor area from encroachment by agricultural, industrial, and commercial developments.

According to the advance prints of planning, the project would mitigate resource losses inflicted by the proposed Walnut Creek Reservoir. However, mitigation cannot be effected by simply maintaining and already existing resource in a project area. As mentioned in our October 30, 1970, report, at least 500 acres should be selected in cooperation with the Iowa Conservation Commission for wildlife mitigation purposes at the Walnut Creek Reservoir site.

Although motorized vehicles (e.g. motorcycles, snowmobiles, and all-terrain vehicles) are receiving increasing public use for recreational purposes, this use is generally incompatible with the ecology of an undisturbed area. Consideration should not be given for possible future development of a trail system in the corridor for these vehicles. Such use is contrary to the basic intent that corridors should remain an avenue of natural conditions. With the foregoing safeguard written into the corridor proposal, this project would help to preserve an area which would have present and future value for its natural aesthetic appeal.

ENVIRONMENTAL CONSIDERATIONS

Section 2 of Public Law 91-190, the National Environmental Policy Act of 1969, states that it is among the purposes of the Act "to promote effort which will prevent or eliminate damages to the environment and biosphere . . .". The following information is responsive to that portion of the Act.

Section 102

(C)(i) Environmental Impact of the Proposed Action -

The proposed project need not be damaging to environmental resources of the area when considered in long-range planning (See item (C)(ii), following).

(C)(ii) Adverse Environmental Effects Which Cannot be Avoided Should the Proposal be Implemented -

Approximately two acres of wooded land would be lost due to installation of bike and foot trails. Our report suggests that a trail system for ATV traffic not be implemented. If ATV's are allowed to use the corridor, a great amount of ecological damage could occur.

(C)(iii) Alternatives to the Proposed Action -

The Bureau of Sport Fisheries and Wildlife has not conducted in-depth studies of alternative plans. Accordingly, we are not in a position to recommend any alternative actions.

(C)(iv) Relationship Between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity -

The project should yield a high level of long-term productivity, with only minimal short-term disturbances.

(C)(v) Irreversible and Irretrievable Commitments of Resources Which Would be Involved in the Proposed Action Should it be Implemented -

Less than two acres of wooded area would be irretrievably committed to hard-surfaced trails. Previously semi-secluded areas will be opened to human traffic. These sacrifices are of a minor consequence, considering the long-range nature of the plan.

II. DES MOINES RIVER ENVIRONMENTAL CORRIDOR (Polk County, Iowa)

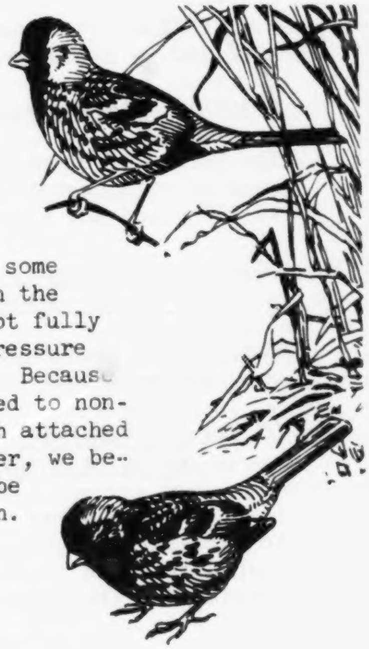
GENERAL DESCRIPTION

The proposed project starts immediately downstream from Saylorville Reservoir and continues downstream to the City of Des Moines. About 4,300 acres will be included in the proposed corridor Of this acreage, about 1,123 acres will consist of fee purchase lands, serving primarily as the environmental corridor with its recreational features. Flowage easements will be taken on an additional 3,183 acres, the approximate limit of 100 year flooding.

The project includes provision for six public access areas. These areas will each have basic facilities for limited day-use and camping. Construction activities will be restricted to the building of a system of trails. Specifically, a five-foot wide foot trail and an eight-foot wide bicycle trail will be constructed on opposite sides of the river.

The proposed corridor area is within a block of land situated between several urban areas. The area is heavily wooded near the river, with moderate to sparse woody vegetation elsewhere. Cropland and grassland, along with an understory of shrub growth, provide suitable habitat for upland game, white-tailed deer, and songbirds.

Setting aside and preserving 4,300 acres in the corridor project will benefit and protect the existing fish and wildlife habitat. Although the corridor would remain too small an area to be considered a good management unit and game populations would be limited, some additional hunting opportunities could be provided with the project. With the nearby urban population, it could not fully satisfy hunting demand. Actually, excessive hunting pressure could virtually eliminate the limited game population. Because of the nearby urban area and the special values attached to non-consumptive uses, we believe that hunting pursuits with attached safety problems would be largely inappropriate. However, we believe that controlled hunting on designated areas may be allowed if approved by the Iowa Conservation Commission.



We note that your draft narrative points out that trails for recreational vehicles such as ATV's (all-terrain vehicles), or snowmobiles should be considered with the project. Your statement continues by explaining that an ATV trail system would be dependent on the ability of the local operating agency to manage such a unit. Recent studies have shown that ATV's and snowmobiles have a distinct adverse effect on resident wildlife and ecology. This happens principally in two ways. First. the noise polluting factor drives wildlife out of the area and secondly, all vehicles of this type are extremely damaging to grass, shrubs, saplings, and other forms of vegetation. Soil erosion is also accelerated. A trail system for ATV's, snowmobiles, and motorcycles should not be permitted in this environmental corridor project. Such use would be inconsistent with the original purpose and intent of the environmental corridor.

We have reviewed the table of estimated visitation presented in your draft narrative prepared for the Des Moines River Environmental Corridor. We agree that public use of this corridor should be high.

Fishing opportunities along the Des Moines River will be greatly improved when the project provides access sites to the tailwater areas downstream from Saylorville Dam. Channel catfish, walleye, largemouth bass, and crappies constitute the preferred sport fish species, while carp, suckers, drum, and mooneye will comprise the less preferred species.

Our Fish and Wildlife Report of 1961 on the Saylorville Reservoir assigned fishery benefit to that project. The report stated that the reservoir's tailwater fishery would only partially compensate for the stream fishery inundated by Saylorville Reservoir. We now anticipate that the portion of the Des Moines River Corridor Project between miles 206.3 and 212.3 will compensate for the stream fishery loss incurred by Saylorville Reservoir. The corridor project should, in fact, improve the total opportunity for river fishing. The daily use estimate of 150 fisherman days for the six-mile reach of the Des Moines River, outlined in Table F-4, Page F-19 of the draft narrative is reasonable.

ENVIRONMENTAL CONSIDERATIONS

Section 2 of Public Law 91-190, the National Environmental Policy Act of 1969, states that it is among the purposes of the Act "to promote effort which will prevent or eliminate damages to the environment and biosphere . . .". The following information is responsive to that portion of the Act.

Section 102

(C)(i) Environmental Impact of the Proposed Action -

The proposed project will retain, in a relatively undisturbed state, an area of high aesthetic importance. Project measures will improve river fishing opportunities in the area by increasing public access. Further, the project will provide for the development of a wide range of recreational uses.

(C)(ii) Adverse Environmental Effects Which Cannot be Avoided Should the Proposal be Implemented -

A few acres of land will be lost, due to the development of foot and bike trails and public access areas. Our report recommends that a trail system for ATV traffic not be implemented. If ATV's are allowed to use the corridor, a great amount of ecological damage could occur.

(C)(iii) Alternatives to the Proposed Action -

The Bureau of Sport Fisheries and Wildlife has not conducted in-depth studies of alternative plans. Accordingly, we are not in a position to recommend any alternative actions.

(C)(iv) Relationship Between Local Short-term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity -

The project should yield a high level of long-term ecological productivity with only minimal short-term disturbances.

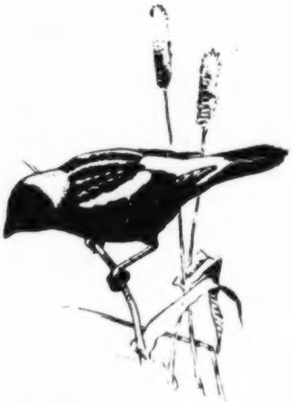
(C)(v) Irreversible and Irretrievable Commitments of Resources Which Would be Involved in the Proposed Action Should it be Implemented -

Only a few acres of wooded area would be irretrievably committed to hard-surfaced trails and previously sheltered areas will be opened to human traffic. These sacrifices will be of a minor consequence, considering the long-range nature and anticipated benefits from the plans.

Sincerely,

S. E. Jorgensen

S. E. Jorgensen
Acting Regional Director



IOWA
CONSERVATION COMMISSION

Mr. S. E. Jorgensen
Assistant Regional Director
Bureau of Sport Fisheries and Wildlife
Federal Building, Fort Snelling
Twin Cities, Minnesota 55111

Dear Mr. Jorgensen:

I regret the delay in answer to the draft on the two project proposals in Iowa, namely the Walnut Creek Environmental Corridor and the Des Moines River Environmental Corridor. Coordination of this draft reply has taken place with the local governmental entities as well.

This department is basically in agreement with the recommendations as proposed. We do feel, however, that the implications of "no hunting" in the environmental corridor below Saylorville could be written in a way which would state that "controlled hunting on designated areas might be allowed."

Yours very truly,

Wm C Brabham

William C. Brabham, Director
Planning and Coordination

WCB/hg

DALLAS COUNTY CONSERVATION BOARD
ADEL, IOWA

August 4, 1971

Re: NCRED-PB

James E. Bunch
Colonel, Corps of Engineers
District Engineer
Rock Island District
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Bunch:

The Dallas County Conservation Board is in acknowledgement of your letter of 28 May 1971.

After time and thought given this project of cost-sharing of recreational development of the proposed Walnut Creek Reservoir, the board members suggest that it would be advantageous to have representation from your office to meet with tne board to discuss the subject again, and to receive more recent facts and information about the plans.

The board suggests a possible meeting date of September 13, 1971, at the Court House Building at Adel in room 301. This will coinside with the September meeting which will convene at 1:30 o'-clock P.M.

Yours very truly,

Arlo Haymond

Arlo Haymond, President

cc-1
rj

Polk County Conservation Board

JESTER PARK
GRANGER, IOWA 50109

Members of the Board
JOHN H. CHAMBERLAIN
GEORGE A. WILSON
WM. H. O'BRIEN
WILBUR C. MILLER
DONALD STARR

WAYNE A. BILLS, Executive Director
Telephone Numbers/Area Code 515
Administration Office 999-2394
Jester Park 999-2212
Chichaqua Habitat 967-2596
Yeader Creek Park 285-7612
Thomas Mitchell Park 967-4889

August 5, 1971

Col. James E. Bunch
District Engineer, U.S. Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61202

Re: NCRED-PB Environmental Corridors

Dear Sir:

We extend to you our apologies for the delay in answering your letters of inquiry dated September 25th, 1970, and May 25th, 1971. We lost our past Chairman to pneumonia and our Executive Director to retirement making delays unavoidable.

The Polk County Conservation Board has carefully studied and evaluated during several board meetings, your proposals for the acquisition of land and the development of Environmental Corridors downstream from the proposed reservior on Walnut Creek, and Saylorville Reservior on the Des Moines River, as outlined in your letter to the Chairman of the Conservation Board under date of September 25th, 1970, and in Appendix "F" of the report on Environmental and Recreational Considerations (Advance Print).

The Environmental Corridor concept of the Corps is to be highly commended, and it is the firm belief of the Conservation Board that many people will reap material benefit from the outdoor recreation facilities provided by the corridors. Therefore, it is with regret that due to prior commitments we are unable to participate at this time.

The Polk County Conservation Board expresses their appreciation for being given an opportunity to participate.

Sincerely,
POLK COUNTY CONSERVATION BOARD

Wayne A. Bills

Wayne A. Bills
Executive Director

WAB/skm

DALLAS COUNTY CONSERVATION BOARD
ADEL, IOWA

NCRED-PB

4 October 1971

Colonel James E. Bunch
Office of the District Engineer
U. S. Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Bunch:

The Dallas County Conservation Board wishes to thank you for providing representation at the 13 September meeting. The young men, Mr. Watson, Mr. Cockerill and Mr. Churchill were helpful to the members by presenting the subject of the proposed Walnut Creek artificial dam and recreational area in a fashion which gave a basis for sound reasoning and decision on the part of the board members.

Though the board is disappointed and regret that this project cannot be realized, they also are grateful to the Corps of Army Engineers for having provided an opportunity for association with the personnel. The experience has been most rewarding.

The Dallas County Conservation Board wishes to withdraw from the cost-sharing and operation of the proposed Walnut Creek dam and artificial lake and recreational project in Dallas County. There are the social reasons, objections to the project from the land owners and residents near to and within the project area; ecological reasons also have been brought to attention. The most important and logical reason, being the lack of local funds to cost-share in the multiuse recreational portion of the plans and the cost of maintainance.

Yours very truly,

Arlo Haymond

ARLO HAYMOND, President

cc: Dir. Co. Activities
State Cons. Comm., -1
Dallas Co. Bd/Supervisors, -1
File, -1

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF OUTDOOR RECREATION
LAKE CENTRAL REGION
3853 RESEARCH PARK DRIVE
ANN ARBOR, MICHIGAN 48104

D6427UM
Jefferson

January 24, 1972

District Engineer
U.S. Army Engineer District,
Rock Island
Clock Tower Building
Rock Island, Illinois 61201

Dear Sir:

We have reviewed the combined report concerning six projects for flood control and related purposes on the Des Moines River, Iowa and Minnesota, submitted with your letter of September 18, 1970.

Based upon the information submitted by your office and with limited field reconnaissance, we offer the following comments and observations for the six projects.

JEFFERSON RESERVOIR

In general, we conclude that our comments of April 5, 1965, regarding the recreation features of this reservoir remain valid to date.

In addition, we offer the following comments:

Although benefits for outdoor recreation and other project features are quite substantial, the adverse effects of the project on existing recreation facilities and on the natural and agricultural environments appear to be considerable. The loss of natural game habitat, high value agricultural land, existing recreation facilities, and several miles of natural stream should be carefully weighed against project benefits.

The Iowa Conservation Commission is reconsidering their attitude on the Jefferson Reservoir project. Your report should include recent information regarding this change in attitude; it is our understanding that the Commission presently considers the project to be low in priority. In addition, it should be stated that the Iowa Scenic Rivers Act has been supported by the Commission and that the North Raccoon River is presently under study as a possible segment of a state scenic river network.

The State Outdoor Recreation Plan, entitled Outdoor Recreation in Iowa, 1968 edition, lists Jefferson Reservoir as a future Corps of Engineers project. The reservoir will be located in the northwest corner of Planning Region VII. However, the plan does not show a need for federal recreation facilities in Planning Region VII through the year 1985, although needs for federal facilities are indicated for the two adjacent regions nearest the proposed reservoir, Regions V and VI. The project is not included in the long-range regional action program of the new (September 1971) state comprehensive outdoor recreation plan.

The use of a 150-day normal recreation season is open to question. It appears to us that a 120-day season is more proper for that latitude and, if this is so, more intensive use of facilities would result assuming the same annual visitation. This intensive use may necessitate more development and/or land acquisition.

Upon further review of the zone of population influence and other factors, an ultimate annual visitation of 1,050,000, as stated in your report, appears reasonable. However, in the absence of any definitive delineation of recreation lands indicated on the maps supplied for our review and considering the possibility of a shorter normal recreation season than indicated in your report, it appears that 500 acres of outdoor recreation land may not be enough to adequately serve the expected visitation. Although other project lands, and the reservoir surface itself, will be used for recreation and buffer purposes, we recommend that consideration be given to acquiring additional land for outdoor recreation purposes if the project is authorized for construction.

DES MOINES RIVER ENVIRONMENTAL CORRIDOR

This environmental corridor, located within the Des Moines Metropolitan Area, will no doubt receive heavy use. The woods and river should be preserved and utilized for outdoor recreation, and this can be achieved through the environmental corridor concept.

It appears, however, that additional fee acquisition should be programmed if adequate spacial requirements and proper protection of the natural environment are to be attained. Serious consideration should be given to acquiring land to existing, paralleling roads where possible (especially on the east side of the corridor) and more of the adjacent woods, old oxbows, and marshes should be acquired. Because of urban pressures, any land lying between existing roads and the corridor may be rapidly developed although flow easements would limit development somewhat. Additional acquisition is especially important if hunting is to be allowed on corridor land, although such use should be tightly controlled because of the urban nature of the general area and possible conflicts with other uses.

We suggest the following parcels of land be considered for acquisition.

T80N-R24W - Section 31. We concur with your acquisition plans.

Section 32. All of the remaining nongovernment land in the west half of the section and that portion of the west half of the southeast quarter lying west of the most westerly of the two roads in the quarter section.

T79N-R24W - Section 6. That portion of the east half of the northeast quarter lying north of the road and all of the land lying east of the most easterly road in the southeast quarter section.

Section 5. The entire section except that portion of the northeast quarter lying east of the light duty road and north of the land presently proposed for acquisition.

Section 4. In addition to the planned acquisition, the entire west half of the southwest quarter should be acquired.

Section 7. The extreme northeast corner, north and east of the roads, comprising 3± acres.

Section 8. That portion of the northeast quarter lying north of the road and the entire east half of the section, in addition to the land presently proposed for acquisition.

Section 9. The northwest quarter of the section.

Section 18. The land lying between the interstate highway and the railroad, in the east half, should be acquired.

Section 17. All of the land presently planned for acquisition, plus the small parcel lying west of Horseshore Lake presently omitted from the planned acquisition.

Section 16. The entire northwest quarter and that portion of the east half of the southwest quarter and the south half of the southeast quarter lying south of the light duty road.

Section 21. The entire northeast quarter in addition to the land presently planned for acquisition.

Section 22. The land acquired should include both banks of Saylor Creek up to the road near the north section line.

We recognize that our suggested acquisitions include some occupied residential and other property. It may be desirable to omit fee acquisition of some of the occupied properties, whereas others could be acquired in fee subject to tenancy rights.

We agree with the types of outdoor recreation uses planned for the corridor (as explained in your report) with the exception of use by motorized recreation vehicles such as motorcycles, ATV's and snowmobiles. Such use, unless well regulated, would be inconsistent with the environmental corridor concept, destructive to the environmental quality of the area, and in conflict with passive uses.

The proposed developments at the four access and public use areas appear to be adequate. However, as stated above, additional land should be acquired for preservation and recreation in this rapidly expanding urban area. Additional land would provide for better public access and better definition of the corridor area.

Although we would not take serious issue with the estimated annual visitations indicated in your report, we feel that the normal recreation season would be on the order of 120 days rather than 150 days. Using a 120-day season, and assuming the same visitation, benefit figures could be reduced because of poorer quality experience while facility costs may be increased.

In summary, this project will contribute to outdoor recreation opportunities in the Des Moines Metropolitan Area and will help in preserving natural areas. Additional land should be acquired, including timber land, old oxbows and marshes; and project boundaries should terminate at roads where possible. The concept of motorized recreational vehicle use should be carefully studied with local and state representatives. The zoning regulation and enforcement requirements and adverse environmental effects of such use should be considered.

WALNUT CREEK ENVIRONMENTAL CORRIDOR

This proposed corridor is located in a developing sector of the Des Moines Metropolitan Area. Acquisition of the corridor lands will preserve a portion of the river valley in a near natural state and provide for outdoor recreation opportunities.

The estimated annual visitation figures appear to be reasonable. However, again we question the application of a 150-day recreation season to the project. It seems that a 120-day season is more logical. If this is so, total annual benefits may be reduced because of the higher cost of additional facilities necessary to accommodate the same annual visitation.

Here, as in the Des Moines River Corridor, it appears desirable that more land be acquired. A strip averaging only 640 feet wide could be subject to overuse. Additional land between the proposed corridor strip and railroads, roads, and other man-made barriers should be acquired. In addition, it would be prudent to extend the corridor downstream to join the upper portion of the West Des Moines and Des Moines local protection project. this would result in additional preservation of much needed open space and would contribute to the continuity of the corridor concept for a longer distance below Walnut Creek Reservoir.

The use of motorized recreation vehicles within the Walnut Creek environmental corridor should be carefully weighed to insure that such use would be consistent with other activities and functions.

We note that your report does not contain information on flow easements within the corridor area. Flow easements do restrict use and limit development of the land subject to flowage and as such contribute to the preservation of natural areas.

Your advance print states that acquisition of this corridor would help offset, or mitigate, the resources to be lost as a result of the Walnut Creek Reservoir project. These resource losses cannot be offset by public acquisition of an existing nearby resource. Although public ownership would result in increased utilization of the nearby resource, the total resource base would be diminished.

In summary, this project will contribute to outdoor recreation opportunities in the Des Moines Metropolitan Area and will help in preserving natural areas. Additional land adjacent to the proposed corridor should be acquired, and the corridor should be extended downstream to link with the West Des Moines and Des Moines local protection project. The problems associated with motorized recreation vehicle use should be carefully weighed before a decision is reached regarding the use of the corridor for such purposes.

WALNUT CREEK RESERVOIR

After a review of the data presented for this project, we conclude that we are in general agreement with the recreation portion of the project plan. In addition to the information presented to you in our letter of May 12, 1965, we offer the following comments:

The use of a five-month normal recreation season may be questionable. It seems that a four-month season would be more appropriate for the Des Moines latitude. Accordingly, if a four-month season is used, it may be necessary to acquire additional land and develop additional facilities to accommodate peak demand use of the area, assuming that the same total visitation of 375,000 recreation days would occur and assuming that the same percentage of this total would use the facilities during the four-month recreation season as in a five-month season. We suggest that serious consideration be given to raising the minimum land acquisition above the 120 acres indicated in your report.

WEST DES MOINES AND DES MOINES LOCAL PROTECTION ALONG THE RACCOON RIVER AND WALNUT CREEK

As stated in our section on the Walnut Creek environmental corridor, it appears reasonable to extend the Walnut Creek corridor downstream to join the West Des Moines and Des Moines local protection project. Considering that the stream bank between the two projects is largely undeveloped, extension of the corridor is opportune at the present time. If this is done, more advantageous recreation use of the valley can be attained as well as preserving much needed open space within the metropolitan area.

We concur with your plans to beautify the project by seeding and planting, and by sculpturing the levee at selected places. In addition, providing access for fishing and other water related activities is well taken. Providing outdoor recreation opportunities is an important project consideration, especially in this urbanized area.

FOURMILE CREEK LOCAL PROTECTION PROJECTS ALONG FOURMILE CREEK IN DES MOINES, IOWA

Based upon limited field reconnaissance of this project area, it seems that an alternative of no project may yield the highest returns over the long term. The protection area, consisting largely of substandard residential housing, may best be converted to open space for outdoor recreation or nature preservation, even though this would involve evacuation of the project area residents.

Although the project is presumably for local protection, no mention is made of the effects accelerated stream velocities will have on downstream unprotected areas. If the project is constructed, it may be necessary to protect, or add to the protection of these lower reaches of the valley. In addition, the protection afforded by the project would result in the protected land reverting to a higher and better use in the economic sense. This would, in turn, accelerate development of this urban area floodplain and such development, in place of open space preservation, may not be in the best public interest.

If the project is constructed, preservation of the wooded sites and development of outdoor recreation opportunity is imperative. The recreation plan outlined in your report appears to be adequate. It should be pointed out, however, that recreation activities will be limited by the amount and duration of ponding in the combination ponding/recreation sites.

The State of Iowa and the Bureau of Sport Fisheries and Wildlife have indicated general concurrence with this letter report. Comments from these agencies have been incorporated into the report where appropriate.

We are sorry for the delay in responding to your letter, but limits of funding and manpower have prevented us from responding in a more timely manner.

Sincerely yours,

John Cherry

John D. Cherry
Regional Director

IOWA
CONSERVATION COMMISSION

FRED A. PRIEWERT, Director

300 Fourth Street, Des Moines, Iowa 50319

Phone: (area code 515) 281-5145

April 11, 1972

Col. James E. Bunch, District Engineer
U. S. Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Re: Des Moines River Report

Dear Col. Bunch:

Further to your request concerning the participation of the Iowa Conservation Commission for the projects outlined in the Des Moines River report, specifically: the Walnut Creek Reservoir, Walnut Creek Environmental Corridor, Jefferson Reservoir and the Des Moines River Environmental Corridor, please find the following as the action taken by the Commission at the April 4, 1972 meeting.

It was the decision of the Commission at that meeting not to participate in the recreation development of the Walnut Creek Reservoir, the Walnut Creek Environmental Corridor or the Jefferson Reservoir. Participation in the Des Moines Environmental Corridor below the Saylorville Reservoir was postponed until staff of the Commission could meet with officials of the City of Des Moines regarding extension of this corridor to the existing protective works within the City of Des Moines. The Commission is indeed interested in this project and will be taking specific action regarding Commission participation in this corridor project at the next meeting scheduled for May 2, 1972.

The Planning staff of the Commission met with representatives of the Des Moines Riverfront Improvement Commission on April 5, 1972. Background on the project was presented and it was indicated that the Riverfront Commission would be requesting the City Council to relay a request to your office concerning extension of the environmental corridor study to the existing protective works within the City of Des Moines. The project offers many opportunities that do not end at the city limits of Des Moines.

Sincerely,

Fred A. Priewert, Director
Iowa Conservation Commission

FAP/GFS/hg

cc: Commissioners
Division Chiefs

CITY OF WINTERSET

WINTERSET, IOWA 50273

April 4, 1974

Col. Walter Johnson, District Engineer
U. S. Corp Engineers
Rock Island District
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel:

We wish to refer to our phone call to you on March 18 and subsequent conversations with Mr. Ray Stearns and Mr. Pat Burke concerning the need of the City of Winterset for development of an additional source of water supply, and our inquiry as to the possibility of the Corp of Engineers initiating flood control measures in the North River Basin in Madison County, which might serve as a source of water supply for Winterset as well as future development of a county-wide or tri-county water supply along with recreational facilities to benefit a considerable portion of the urban and rural population in the several counties lying southwest of the City of Des Moines, Iowa.

We are enclosing herewith, a copy of a Comprehensive County Water and Sewer Plan prepared by Harold Hoskins & Associates, Inc., Lincoln, Nebraska, which Mr. Stearns indicated might be of some assistance in preparation of studies and reports for the State of Iowa by your division, as well as a source of information in connection with our interest in possible development of flood control, recreation and water supply facilities in the North River Basin.

We are appreciative of your response to our phone call and we will be pleased to meet with Mr. Pat Burke at his convenience.

Very truly yours,

O. D. Simmons, Secretary
Board of Trustees

City of West Des Moines

MUNICIPAL BUILDING 318-5th
WEST DES MOINES, IOWA 50265
TELEPHONE (515) 255-1161

November 20, 1974

Department of the Army
Rock Island District, Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Attention: Mr. Pat Burke

Gentlemen:

We extend to the Corps our sincere appreciation for causing a meeting to be held recently in West Des Moines, Iowa with local community officials and members of your staff, pertaining to flood protection along the Raccoon River and Walnut Creek, and perhaps renewing in part the project that was proposed in 1970.

Following our conversation at the meeting held on November 19, 1974, we briefed the West Des Moines City Council and they are in full accord that some sort of flood protection needs to be provided, and subject to review of the up-dated and final plans, will cooperate in every way withi their capabilities. Please understand the Council cannot guarantee financial participation at this time until a current appraisal has been made and the program to be submitted is considered acceptable.

We can express our intent of the concept and urge the subject project be up-dated and renewed by the United States Army Corps of Engineers with cooperation from the Iowa Natural Resources Council, the Central Iowa Regional Association of Local Governments, and the local communities involved.

We further request that CIRALG and their Technical Committee assume active participation in this subject flood protection project and that the Corps work directly with that organization in this regard.

Sincerely yours,

Elmer P. True
City Manager

EPT/dn
cc. WDM Mayor & Council
Terry Smith - CIRALG
Richard Wilkey - DM Mgr.
Leo Johnson - DM
Robert Mickle - DM
Jim Cooper - Iowa Natural Resources
John Bryan - WDM Plan Director

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
1735 BALTIMORE – ROOM 249
KANSAS CITY, MISSOURI 64108

December 4, 1974

Colonel Walter H. Johnson
District Engineer
Corps of Engineers, Rock Island
District
Clock Tower Building
Rock Island, Illinois 61201

Attention: NCRED-PB

Dear Colonel Johnson:

We have reviewed the need for reservoir storage for water quality control in a proposed multi-purpose reservoir near Jefferson, Iowa on the Raccoon River in reference to your October 23, 1974 letter and Section 102(b) of the FWPCA Amendments of 1972.

Our policy stipulates that stream flow shall not be used as a substitute for the provision of adequate waste treatment or other methods for controlling waste at the source. EPA defines "adequate waste treatment or other methods for controlling waste at the source" as the best available pollution control technology economically achievable, including advanced waste treatment techniques, land disposal, land management practices, process and procedure innovations, changes in operating methods, and other alternatives.

The Raccoon River was designated as a water quality limited stream by the Iowa Department of Environmental Quality. Waste load studies were made by the Department of Environmental Quality. The allocations assigned to the various dischargers are achievable by use of treatment processes described by EPA as the best available treatment technology. The prime constraints considered in the waste load allocation studies were dissolved oxygen and ammonia. Consequently, storage is unnecessary for water quality control.

Water quality monetary benefits obtainable from streamflow regulations shall be credited only to reservoir storage specifically required for and allocated to water quality control. Any minimum flows required to protect the natural stream environment in the immediate vicinity of the proposed lakes should be considered as a benefit to the enhancement of fish and wildlife resources.

Flow regulation practices from impoundments which result in lower than natural low flows or release water of less than preimpoundment quality are considered to be in violation of the anti-degradation clause of the water quality standards. During periods when natural flows would occur equal to or less than the flow values used to design downstream waste treatment facilities, the rate of discharge past the dam should be at least equal to the rate of inflow above the dam, whether or not water quality storage is provided.

Thank you for the opportunity to review this project at this stage of your investigation.

Very truly yours,

Jerome H. Svore
Regional Administrator

CITY OF WINTERSET

WINTERSET, IOWA 50273

MAYOR AND CITY COUNCIL

BOARD OF TRUSTEES
ELECTRIC LIGHT PLANT, WATERWORKS

January 10, 1975

Mr. Walter H. Johnson
Colonel, Corps of Engineers
District Engineer
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

In a letter dated May 17, 1974, you advised of the preparation of a Review of Reports for Flood Control and Related Purposes on the Des Moines River in Iowa and Minnesota for submission to Congress in 1975.

It was also reported that the Corps of Engineers would reevaluate, on a preliminary basis, the flood control reservoirs in the Winterset area based on water supply needs indicated in "The Comprehensive County Water and Sewer Plan" which we submitted for your study, and the reevaluation would be incorporated as part of the final Des Moines River Report.

The City of Winterset through its Board of Trustees of the Municipal Electric System and Waterworks in a meeting January 8th employed Vance & Hochstetler, Engineers, Winterset, Iowa, to complete a study and report on existing supply, distribution lines and storage (tower) in relation to present and future needs.

If the evaluation by the Corps of Engineers contained in the Des Moines River Report for submission to Congress should be available for our information in connection with the studies now under way by our Engineers, it will be appreciated if a brief summary of the reevaluation could be sent to us. If the studies indicate a favorable balance between benefits and costs, this information could be a valuable consideration in our studies of means to provide water for present and future requirements.

Thanks kindly for your assistance. Any further suggestions in the matter will be appreciated.

Yours very truly,

O D Simmons

O. D. Simmons, Secretary
Board of Trustees

COMMISSIONERS
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HERBERT T. REED--WINTERSET
JOHN C. THOMPSON--FOREST CITY

IOWA
CONSERVATION COMMISSION

FRED A. PRIEWERT, Director
300 Fourth Street, Des Moines, Iowa 50319
515/281-5145

An EQUAL OPPORTUNITY Agency

February 13, 1975

Mr. Mike Cockrill
Army Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Mike:

I have reviewed the contract between the State Conservation Commission and Martin Marietta for the removal of sand and gravel in the area along the Raccoon River and Walnut Woods State Park. The operation is scheduled to be completed in 1981; however, there exists a clause in this agreement which allows the firm to continue operations until 1996 if they so desire.

Martin Marietta has agreed to cooperate with the Conservation Commission in the shaping of the area when the operations are complete within the constraints that Martin Marietta is in operation to make a profit.

Therefore, the Conservation Commission has made no firm plans for the development, operation, or maintenance of this area. Logically our planning efforts for this area will hinge on the actions of Martin Marietta and cannot be forecast at this time.

Sincerely,

Steve L Brenton

Steve L. Brenton
Superintendent of Planning

SLB:sdh

United States Department of the Interior
BUREAU OF OUTDOOR RECREATION
MID-CONTINENT REGION

MAILING ADDRESS:
Post Office Box 25387
Denver Federal Center
Denver, Colorado 80225

STREET LOCATION:
603 Miller Court
Lakewood, Colorado
Telephone 234-2634

FEB 14 1975

Colonel Walter H. Johnson
District Engineer
U. S. Army Engineer District, Rock Island
Clock Tower Building
Rock Island, Illinois 61201

Attention: Mr. Patrick Burke, Planning and Reports Branch

Dear Colonel Johnson:

We submit the following comments in response to your letter of January 30, 1975, which provided preliminary information on the Corps of Engineers local protection projects along Walnut Creek and Raccoon River for the communities of West Des Moines and Des Moines, Iowa.

There appears to be no recreation projects funded with Land and Water Conservation Funds within the proposed project area.

We recommend that the alternative of creating environmental corridors as part of the local protection projects be fully considered. By creating essentially natural floodways, open space is created within the city environments. These floodways can be developed into linear parks featuring recreation developments that are compatible with occasional flooding.

We appreciate being kept informed as this project progresses.

Sincerely,

Albert G. Baldwin
Assistant Regional Director
Resource Planning Services

United States Department of the Interior

FISH AND WILDLIFE SERVICE
BUREAU OF SPORT FISHERIES AND WILDLIFE
Federal Building - Room 1748
601 East 12th Street
Kansas City, Missouri 64106

March 17, 1975

Colonel Walter H. Johnson
District Engineer
U.S. Army Engineer District, Rock Island
Clock Tower Building
Rock Island, IL 61201

ATTN: Mr. Patrick Burke, Planning and Reports Branch

Dear Colonel Johnson:

This responds to your request for our comments on the proposed plan for local flood protection along Walnut Creek and the Raccoon River in the communities of West Des Moines and Des Moines, Iowa. We realize that the project is being restudied and changes in various project features may occur.

Most wildlife losses resulting from project construction would be temporary in nature, and the overall adverse impact would be lessened through a seeding and planting program such as was described in your 1970 report. Native plant species would provide more requirements of resident wildlife than exotic plant species and are recommended for wildlife and beautification plantings. Wildlife values should also be considered when choosing seed mixtures for erosion control seeding. We realize native prairie species do not establish quickly enough to provide early erosion control needs. However, they are extremely competitive once they become established, and we recommend their use in selected areas with low erosion potential. The variety of species in this group provides many forms and colors, supplies plant diversity valuable to wildlife, and diminishes the need for maintenance since neither mowing or blanket spraying is needed for weed control.

We concur with the plans for placement of the levee. Such placement would preserve open space and wildlife habitat. The integrity of the areas near the streams should be further protected through minimizing the number of access roads beyond the levee, restriction of motorized recreational vehicles (e.g. motorcycles, snowmobiles, and all terrain vehicles) to access roads only, and emphasis of natural environmental values in areas designated for future park development. Measures should also be taken to restrict motorized recreational vehicles from footpaths along the levee crown.

Although these vehicles are highly used by the public for recreational purposes, this use is often incompatible with the ecology of natural or wildlife areas. We recommend a safeguard restricting such use be written into the project proposal.

Although channelization of Walnut Creek has already occurred in the area proposed for further channel modifications, we do not favor this additional construction if it can be feasibly avoided. Would extension of the floodwall southward to meet the existing levee eliminate the need for channel modification?

Thank you for the background material and the opportunity to provide our comments.

Sincerely,

Charles K. Phenicie

Charles K. Phenicie
Area Manager

cc: RD, Denver, CO (ES)
IA Conservation Comm.

STATE HISTORICAL DEPARTMENT OF IOWA
DIVISION OF HISTORIC PRESERVATION

ADRIAN D. ANDERSON, DIRECTOR
HISTORIC PRESERVATION OFFICER

April 3, 1975

Walter H. Johnson
Colonel, Corps of Engineers
District Engineer
Rock Island District
Department of the Army
Clock Tower Building
Rock Island, Illinois 61201

Re: Feasibility Study - Des Moines River Basin - West Des Moines

Dear Colonel Johnson:

Thank you for the Feasibility Study for this project. It appears to reflect the status of historic resources in the proposed project area, so far as is known. It does not, however, address itself to the methods of mitigating any adverse impact which might arise, should presently unidentified historic or archaeological resources be identified during the course of construction, should the project be authorized. I am sure this oversight can be corrected if the project is authorized.

Sincerely,

Adrian D. Anderson

Adrian D. Anderson, Director
Historic Preservation Officer

ADA:pah

STATE HISTORICAL DEPARTMENT OF IOWA
DIVISION OF HISTORIC PRESERVATION

ADRIAN D. ANDERSON, DIRECTOR
HISTORIC PRESERVATION OFFICER

April 3, 1975

Walter H. Johnson
Colonel, Corps of Engineers
District Engineer
Department of the Army
Rock Island District
Clock Tower Building
Rock Island, Illinois 61201

Re: Interior Draft Feasibility Report Local Flood Protection,
West Des Moines, Iowa

Dear Colonel Johnson:

I have reviewed the draft I. D. F. R. for the project and feel that the status of current knowledge in regard to historical resources is adequately treated.

I assume that the usual procedures for mitigating any unforeseen adverse impact will be initiated if the project is authorized. As always, we are ready to assist in any way we can.

Sincerely,

Adrian D. Anderson, Director
Historic Preservation Officer

ADA:pah

DES MOINES WATER WORKS
BOARD OF WATER WORKS TRUSTEES
1003 LOCUST STREET
DES MOINES, IOWA 50307

MAURICE A. KING
GENERAL MANAGER

April 4, 1975

Colonel, Walter H. Johnson
District Engineer
Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

RE: NCRED - PB

Dear Colonel Johnson:

The Interim Draft Feasibility Report concerning flood protection in the vicinity of Walnut Creek and Raccoon River in the City of Des Moines has recently come to our attention.

We have reviewed the report and comment that as we understand the plan it will involve land owned, operated, and maintained by the Board of Water Works Trustees of the City of Des Moines.

As shown on Plate E-19 of the report, it appears that construction would occur on land owned by the Board of Water Works Trustees. The Board owns all of the land on both sides of Walnut Creek and Raccoon River in Sections 12 & 13, T 78N, R 25W. It would be helpful if you could furnish to us the proposed construction plans in this area so that we may review them for possible effect on our installations.

Your cooperation in this matter will be appreciated.

Very truly yours,

BY Maurice A. King
Maurice A. King
General Manager

HKD:LM

cc: H. King Dawson

city of des moines
Office of the City Manager

April 24, 1975

Colonel Walter H. Johnson
District Engineer
U.S. Army Engineer District, Rock Island
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

At its meeting of April 21, 1975 by Roll Call No. 1726, the Des Moines City Council received and filed the U.S. Army Corps of Engineers' feasibility study on the Walnut Creek Flood Protection Project dated March, 1975. At that time the Council directed that I communicate to the Corps of Engineers the City's interest, desire and willingness to participate in the design memorandum and final design plans.

This action was taken following the City Administration's review of the West Des Moines-Des Moines, Iowa Local Flood Protection Project Feasibility Study resulting in the determinations that it is a good project and should be advanced with all haste.

Should you desire any further information, please contact my office.

Sincerely,

Richard Wilkey

Richard Wilkey
City Manager

RW/mlb

cc: Public Works Director
City Engineer

DEPARTMENT OF TRANSPORTATION
REGIONAL REPRESENTATIVE OF THE SECRETARY
ROOM 634, FEDERAL BUILDING
601 EAST 12th STREET
KANSAS CITY, MISSOURI

REGION VII

April 30, 1975

Colonel Walter H. Johnson
District Engineer
Rock Island District Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

The Draft Environmental Statement and the Interim Draft Feasibility Report for a proposed local flood protection project at West Des Moines-Des Moines, Iowa, has been reviewed by the Department of Transportation and our comments are as follows:

The Draft EIS indicates material for the levee construction will be obtained from a borrow area located 2.5 miles from the project. The location of this borrow area and haul routes needed to transport the material to the project should be identified. The following impacts along the haul routes and resulting from the material hauling process should be discussed in the Final Statement.

1. Additional roadway or bridge maintenance costs.
2. Safety measures during hauling operations.
3. Impacts on noise and air quality.

Thank you for the opportunity to review and comment on these documents.

Sincerely,

R. R. Waesche
RADM USCG (Ret.)
Secretarial Representative
Region VII

cc:
Mr. John B. Kemp, FHWA
RADM G. H. P. Bursley, USCG
Mr. William E. Loftus, FRA

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGION VII
FEDERAL BUILDING
601 EAST 12TH STREET
KANSAS CITY, MISSOURI 64106

OFFICE OF
THE REGIONAL DIRECTOR

May 2, 1975

Walter H. Johnson, Colonel
Department of the Army
Rock Island District,
Corps of Engineers
Clock Tower Building
Rock Island, Illinois 64106

RE: Draft Environmental Impact Statement
West Des Moines - Des Moines, Iowa
Local Flood Protection

Dear Colonel Johnson:

Review of the above referenced document indicates that there is no apparent impact on programs of the Department of Health, Education and Welfare. It would appear that the impacts of the proposed action and the reasonable alternatives have been adequately addressed.

Thank you for this opportunity to review and comment relative to your anticipated actions.

Sincerely,

William H Henderson

William H. Henderson
Regional Environmental Officer

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

823 Federal Building, Des Moines, Iowa 50309

May 2, 1975

Colonel Walter H. Johnson
Rock Island District Engineer
U. S. Army Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

The draft environmental impact statement for the proposed West Des Moines local flood protection project addressed to this office on March 26, 1975 has been received and reviewed.

We have no comments at this time.

The Soil Conservation Service, through the local conservation district, would be happy to provide assistance with general soil site preparation.

We appreciate the opportunity to review and comment on this proposed work.

Sincerely,

Wilson T. Moon

Wilson T. Moon
State Conservationist

MID-IOWA SNOWMOBILE CLUB, INC.
P.O. Box 2722
Des Moines, Iowa 50315

May 5, 1975

The Mid-Iowa Snowmobile Club, a group of Polk County residents incorporated and interested in winter sports, particularly snowmobiling, would like to comment on the proposed Raccoon River, Walnut Creek, and Jorden Creek flood protection project.

Having read the Corps of Engineers Feasibility Study of the above project, we agree with the intent and general concept as outlined. In addition, we feel it would serve the residents of West Des Moines and Des Moines if the proposed levees were constructed for, and designated as, multipurpose recreation trail systems.

It is well established and documented that properly designed and designated trail systems provide an opportunity for safe outdoor recreation. By providing multipurpose use areas such as those designed for golfing, horseback riding, baseball, tennis, and many other outdoor sports, the community offers all residents the means to persue the activity of their choice. This fact must be considered for winter as well as summer usage.

Polk County and its residents need multipurpose recreational areas such as the trail system proposed. The Mid-Iowa Snowmobile Club therefore endorses and encourages that the Raccoon River, Walnut Creek, and Jorden Creek Project levees be designated as multipurpose use areas.

Wm B. Graham III

William B. Graham III
President

City of West Des Moines

MUNICIPAL BUILDING 318-5th
WEST DES MOINES, IOWA 50265
TELEPHONE (515) 255-1161

May 5, 1975

Walter H. Johnson
Colonel, Corps of Engineers
District Engineer
Rock Island, Illinois 61201

Dear Colonel Johnson:

The Mayor, City Council, Administrative and Technical staff of the City of West Des Moines, Iowa, have reviewed very carefully the Draft Feasibility Study and Environmental Statement prepared by the United States Army Corps of Engineers relating to local flood protection, filed with this community in March 1975. The selected plan of improvements appears to be in accord with benefits desired and the City Council of the City of West Des Moines agrees to this communities share of local participation and responsibility.

Almost all of the main channel of the Raccoon River and Walnut Creek is located outside the corporate boundaries of this city, yet our people have endured substantial damage over the years because of the flooding of these streams. Facts attesting to the extent are very well outlined in the report from the Corps of Engineers. The only regret we have is that the Study and Plan as proposed was not done years ago. We urge immediate consideration and Congressional approval for early implementation.

We wish to extend our sincere appreciation to the U. S. Corps of Engineers and to other governmental and private interests for their efforts in furnishing and compiling data as contained in the draft report and submission of the selected plan.

By Order of the West Des Moines
City Council

Murray E. Drake
Mayor

MED/EPT/dn

STATEMENT BY

IOWA CONSERVATION COMMISSION

VALLEY HIGH SCHOOL
WEST DES MOINES, IOWA
MAY 6, 1975

The Iowa Conservation Commission has no formal objection to the proposed project for flood damage reduction along the Raccoon River, Walnut Creek, and Jordan Creek at West Des Moines and Des Moines. Review of the draft feasibility study is still in progress and at this time the Commission believes the Corps has addressed itself to the significant environmental questions.

The Conservation Commission would like to again call the Corps' attention to the future recreation potential that exists in the Martin Marietta sand and gravel operation to the west of the present levee proposal, After the sand and gravel operations cease, the lake area will be deeded over to the Commission, and with local participation, the area could be developed along the same general guidelines as Gray's Lake in Des Moines. The Iowa Conservation Commission would like the Corps of Engineers to investigate the feasibility and the effects, both upstream and downstream, of extending the levee system around the Martin Marietta site. We would reaffirm the Draft's contention that the proposed levee system be utilized and incorporated into a multi-purpose trail system for the West Des Moines and Des Moines metropolitan area.

The Conservation Commission would also like to call to the Corps' attention the need for bank stabilization along certain portions of the Raccoon River. A case in point is the bank loss along Walnut Woods State Park.

May 6, 1975

Statement of
Iowa Natural Resources Council
at
Public Meeting May 6, 1975
Valley High School, West Des Moines, Iowa
Regarding
West Des Moines - Des Moines, Iowa
Local Flood Protection

The Iowa Natural Resources Council is aware that serious flood problems do exist along Walnut Creek and the Raccoon River at the Cities of West Des Moines and Des Moines.

The recommended project as proposed does provide a relatively high degree of flood protection for the Cities of Des Moines and West Des Moines. The level of protection provided by the project meets the criteria of the Resources Council relating to levees and flood walls constructed for flood control. The alignment of the recommended levee and floodwall is consistent with the criteria of the Resources Council relating to flood plain encroachment.

The recommended project represents an economical alternative available for reducing flood damages in the Cities of Des Moines and West Des Moines consistent with the constraints of the authorization which permits the Corps of Engineers to participate in the project development.

The Iowa Natural Resources Council believes there is a need for implementation of a structural program and non-structural alternatives for managing the flood damages of the Raccoon River and Walnut Creek in the Cities of Des Moines and West Des Moines and urges the Corps of Engineers to proceed with the completion of the report and submit it to their higher authority for appropriate action consistent with the desires of the affected communities.

For the Iowa Natural Resources Council

Othie R McMurry

Othie R. McMurry, Director

Chamber of Commerce of West Des Moines

221 5th Street, West Des Moines, Iowa 50265
(515) 279-7766

May 6, 1975

Department of the Army
Rock Island District
Corps of Engineers
Rock Island, Illinois 61201

Gentlemen:

The advantages to the cities of West Des Moines and Des Moines in adequate flood control measures should be obvious to everyone and should need no overt support from any group or individual. We need only consider the benefits to be gained by some 922 residences, 143 commercial properties, and 22 light industries to feel secure in supporting such flood control measures as are now being proposed.

Therefore, upon formal action taken Thursday, May 1, 1975, the Board of Directors of the Chamber of Commerce of West Des Moines endorses the concept of the flood control measures as presented by the United States Army Corps of Engineers.

We urge that the proper bodies move forward with all haste to make adequate flood control preparations for our community.

Sincerely,

James L. Crosby

James L. Crosby, President

JLC:hc

W.H. JAMISON & CO., INC.
general contractors

May 6, 1975

Colonel Walter H. Johnson, District Engineer
Department of the Army
Rock Island District, Corps of Engineers
Rock Island, Illinois 61201

RE: NCRED-PB

Gentlemen:

I have reviewed the proposed levee construction particularly as it pertains to the west bank of Walnut Creek north of Ashworth Road.

In my opinion the proposed location will negate any chance of further development in this area and will ultimately reduce this area to worthless waste land. This area, due to its geographic location and its easy access to both east-west and north-south thoroughfares holds considerable promise for future development which would be of tremendous value to the city of West Des Moines as a source of tax revenue. This area is bounded on the east by Walnut Creek and on the West by the railroad tracks and this levee will not only prevent any further development on the east side of Hoak Drive, but will also reduce the property on the west side of the levee to a narrow sliver of land which will be of little or no value for future development. and would probably render it unusable for it's present stage of development.

As an alternative to the proposed plan I am of the opinion that further consideration should be given to improving the existing channel and relocating the proposed levee to the west bank of Walnut Creek. The channel improvement should permit considerable reduction in the levee height. We could then relocate Hoak Drive to the top of the levee and vacate the existing Hoak Drive. If the levee were not too high we property owners on the east side of Hoak Drive would have access to our property from the levee, and the property owners on the west side would be unaffected by this work.

Transfer of title of the vacated Hoak Drive to the property owners on the east side of Hoak Drive would reduce the right of way acquisition costs to some extent and would allow a major portion of this area to be developed to it's fullest potential.

Thank you for your consideration.

Very truly yours,

W. H. JAMISON & CO.

W. H. Jamison
President

March 3, 1849

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Federal Building - Room 1746
601 East 12th Street
Kansas City, Missouri 64106

May 8, 1975

Colonel Walter H. Johnson
District Engineer
U.S. Army Corps of Engineers
Rock Island District
Clock Tower Building
Rock Island, IL 61201

Dear Colonel Johnson:

We have reviewed the draft environmental statement and feasibility report for local flood protection in the Des Moines River Basin, Polk County, Iowa, and offer our comments. Most of the comments are restricted to the environmental statement and sections of the feasibility report pertinent to the subject project.

General Comments

In general, the potential fish and wildlife losses are adequately described. However, these losses and the cost of replacing them should be identified as project costs and distributed among appropriate project functions. Specific measures to compensate for wildlife losses should be outlined in the environmental statement.

The information presented on rare and endangered species is not complete. The exact status of each species in the project area should be established and presented in the final environmental statement.

Wildlife values were apparently not fully considered in the study of alternate alignments. Wildlife aspects of all alternates should be discussed. Alternate alignment 1-C, which proposed raising a portion of Hoak Drive as a part of the line of protection, would be less detrimental to wildlife habitat. Also, the encroachment into the northwest portion of Denman Woods and the wooded area east of North Valley Drive could be avoided by a minor change in alignment. We strongly recommend that these changes in alignment be incorporated into the selected plan in order to lessen the impact of the project on wildlife resources.

Zoning designed to restrict further industrial and residential encroachment into the floodplain should be a prerequisite to any flood protection plan. In many cases such development destroys more wildlife habitat than construction of the project. We realize that zoning is the responsibility of local authorities, but we maintain that it could be included as a project requirement in the negotiated agreement between the Federal Government and local sponsors. In our opinion, realizing project benefits for the protection of future developments in the floodplain performs quite the opposite function and condones poor floodplain management at the expense of natural environmental values.

Specific Comments (Draft EIS)

1.011. Portions of the existing levee have vegetative cover valuable to wildlife. We recommend repair work be restricted to areas where it is most needed instead of general reconstruction of the entire levee. Plans for this repair work should be discussed in the final EIS.

2.0226. The exact status of the showy orchis in the project area should be established. A slight adjustment in the proposed alignment would allow the project to avoid encroachment upon Denman Woods and would ensure that none of these plants would be disturbed.

4.0265. We recommend that native plant species be considered for the seeding and planting program. These species would provide more requirements of resident wildlife than exotic plant species. Wildlife values should also be considered when choosing seed mixtures for erosion control seeding. We realize native prairie species do not establish quickly enough to provide early erosion control needs. However, they are extremely competitive once they become established, and we recommend their use in selected areas with low erosion potential. The variety of species in this group provides many forms and colors, supplies plant diversity valuable to wildlife, and diminishes the need for maintenance since neither mowing or blanket spraying is needed for weed control.

4.0292. The integrity of the areas near the streams should be protected by minimizing the number of access roads beyond the levee, restriction of motorized recreational vehicles (e.g. motorcycles, snowmobiles, and all terrain vehicles) to access roads only, and emphasis of natural environmental values in areas designated for future park development. The recreational plan should also include measures to restrict motorized vehicles from footpaths or bicycle paths along the levee crown. Although these vehicles are highly used by the public for recreational purposes, their use is often incompatible with the ecology of natural or wildlife areas. The existing levee shows evidence of high use by these vehicles, and we recommend a safeguard restricting such use on both the old and new levee be written into the project agreement.

Thank you for the opportunity to provide our comments.

Sincerely yours,

Charles K. Phenicie

Charles K. Phenicie
Area Manager

cc: RD, Denver, CO (ES)
IA Cons. Comm.
OEC

Iowa State Snowmobile Association

May 12, 1975

Dear Colonel Johnson,

It has been brought to my attention that a proposed levee system for flood- control be built in the Des Moines, West- Des Moines area.

The Iowa State Snowmobile Association would favor a Multi-purpose Trail system be incorporated with this project.

Recreation is a vital part of todays Society, and Horseback riding, Bicycling, Hiking, Cross- Country Skiing and Snowmobiling are all forms of recreation which are compatible on a Multi- purpose Trail System.

The City of Duluth, Minnesota is a fine example of how a Trail system can be incorporated in a metropolitan area. This can provide recreational oppertunities for many people.

The Iowa State Snowmobile Association would be glad to work with the Army Corps of Engineers, the Iowa State Conservation Commission and any local Des Moines Organizations in any way we can to help develop a Multi-purpose Trail system to enhance a Flood- rol project.

Sincerely,

Richard Grosse
President- I.S.S.A.
7543 Ford Road
Cedar Falls, Iowa
50613

United States Department of the Interior

NATIONAL PARK SERVICE
MIDWEST REGION
1709 JACKSON STREET
OMAHA, NEBRASKA 68102

N REPLY REFER TO:

L7619 MWR CE
(ER-75/314)

MAY 13 1975

Colonel Walter H. Johnson
Corps of Engineers
District Engineer
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

The draft environmental statement for Flood Protection, Des Moines River Basin, Polk County, Iowa, has been reviewed by the National Park Service.

We are pleased to note the careful review that has been made of historic and archeological sites in this document. This review appears to be in substantial compliance with the procedures for the protection of historic and cultural properties established by the Advisory Council on Historic Preservation and published in 36 CFR Part 800 and also in Federal Registers of January 25, 1974 (copy enclosed) and February 4, 1975.

We would, however, call your attention to Section 800.4 of these procedures wherein Federal agencies are directed to identify cultural properties included in or eligible for inclusion in the National Register of Historic Places. Please note in Section 800.4(a)(2) that the identification of eligible properties is to be made in consultation with the State Historic Preservation Officer (with a subsequent determination of eligibility made by the Secretary of the Interior) and, in Section 800.4(b), that a determination of effect on an included or eligible historic property is also to be made in consultation with this officer.

No evidence of consultation with the State Historic Preservation Officer for Iowa, Mr. Adrian Anderson, B-13 MacLean Hall, Iowa City, Iowa 52242, has been presented, although it is stated (page 17 of the EIS) that coordination will be maintained with the State Historic

Preservation Officer in the event that additional sites may be discovered during the actual construction period. It is our understanding that the Environmental Research Company works closely with the State Historic Preservation Officer in all phases of study; however, this does not make Corps consultation with the SHPO unnecessary.

The possibility that eligible Register sites are present which would be affected (beneficially or adversely) by the project should be explored in consultation with the SHPO and the determination of no effect on the Jordan House (paragraph 4.02103 of the EIS) should also reflect that it was made in consultation with Mr. Anderson.

Sincerely yours,

Merrill D. Beal

Merrill D. Beal
Regional Director

Enclosure

United States Department of the Interior
BUREAU OF OUTDOOR RECREATION
MID-CONTINENT REGION

MAILING ADDRESS:
Post Office Box 25387
Denver Federal Center
Denver, Colorado 80225

STREET LOCATION:
603 Miller Court
Lakewood, Colorado
Telephone 234-2634

IN REPLY REFER TO:
D6427
ER 75/314

MAY 14 1975

Colonel Walter H. Johnson
District Engineer
Rock Island District
Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

We have reviewed the draft environmental statement and feasibility report for flood protection, Des Moines River Basin, Polk County, Iowa, as requested in your letter of March 26, 1975, to John W. Larson of the Department of the Interior in Washington, and have the following comments to offer:

Feasibility Report

Based on data as provided in this report, parks which have received funding from the Land and Water Conservation Fund will not be adversely affected by the levee project in West Des Moines.

We fully support the recreation plan discussed in the report on page E-68 of using the levees for such purposes as hiking, bicycling, nature study, bird watching, and picnicking. This plan should complement the riverfront recreational development plan being considered by the City of Des Moines.

Consideration should be given, in this project, to acquiring additional land in the 63rd and Railroad Avenue area to provide public access to the Raccoon River for recreation purposes.

We also suggest that the Corps should study the feasibility of extending the levee around the 200-acre sand pit lake near the Martin Marietta Corporation. This would allow the site to eventually be fully developed for recreation purposes without loss or damage to the facilities from flooding.

We believe that if the three proposals mentioned above are included in the project, the full recreation potential will be realized.

raft Environmental Statement

The statement covers outdoor recreation and related environmental matters as it relates to this project in a satisfactory manner. However, it would be desirable if the environmental statement was expanded to show the interrelationship of this project to the riverfront recreational development plan being considered by the City of Des Moines.

Sincerely,

for
Robert J. Arkins
Assistant Regional Director
Land Use Coordination

cc: BOR, WASO

MARTIN MARIETTA AGGREGATES

CENTRAL DIVISION
4006 FIRST AVENUE, N.E.
CEDAR RAPIDS, IOWA 52406
TELEPHONE (319) 364-0201

GENE M. MASON
VICE PRESIDENT & GENERAL MANAGER

May 15, 1975

Col. Johnson,District Engineer
U. S. Army Engineers
Clock Tower Building
Rock Island, Illinois 61202

Re: Feasibility study for flood damage reduction and related purposes, Des Moines River Basin, March, 1975

Dear Col. Johnson:

The management of the Central Division of Martin Marietta Aggregates has reviewed the selected plan for the above project.

Upon reviewing the proposed location of the levee on our property, it appears the levee is routed through our sand and gravel plant. We therefore are requesting that at the time the Raccoon River floodway is established, the levee section which starts at Station 19 + 50 and is parallel to Jordan Creek be extended easterly to the edge of the plant area. The levee then will proceed northerly along the plant area, and tie back into proposed levee alignment above Station 60 + 00 near where the pump station symbol is shown on your map (see attached map).

Sincerely,

Gene M. Mason

GM:bh

An "on-site" inspection of the property will point out the detrimental effects at the proposed location.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
1735 BALTIMORE – ROOM 249
KANSAS CITY, MISSOURI 64108

May 16, 1975

Colonel Walter J. Johnson, USA
District Engineer
Rock Island District
U.S. Army Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

Re: West Des Moines - Des Moines, Iowa
Local Flood Protection Project

We have reviewed the Draft Environmental Statement on the above referenced project. The project and statement have been rated ER-2. This rating means the Environmental Protection Agency (EPA) has environmental reservations with the project as proposed and requests additional information be provided in the final statement to permit a full assessment of the project's impacts. Our primary concern is the potential for the contamination of the Des Moines public water supply system. The following are our comments:

Water Supply

The principle source of drinking water for the City of Des Moines is the infiltration galleries which run parallel to the Raccoon River. The statement should show the location of these galleries on the project maps. An evaluation of the potential infiltration of pollutants from the ponding areas adjacent to the Raccoon River should be included in the final statement. This would permit an assessment of possible health risks from pollutants introduced into the public water supply. The draft statement and Feasibility Study indicate that project induced urban and industrial development will occur within the protected area of the levee project. An assessment should be provided which discusses the possible influence this induced development may have on the water quality of the Raccoon River and the Des Moines public water supply.

If the Administrator of EPA, upon review of the final project design, determines that a possible contaminant introduction to the recharge zone surrounding these galleries could result in a significant hazard to public health, he will publish this determination and no commitment for federal financial assistance may be entered into for this project until a new plan or design alleviates the hazard (Safe Drinking Water Act, PL.93-523).

Water Quality

The final statement should provide information on anticipated water quality of the proposed storm water ponding areas. An evaluation of the potential health risks associated with ponding storm water near residential developments should be specifically included for ponding areas one and four.

The location of the 44-acre tract of land for proposed borrow material extraction is adjacent to the headwaters of Jordan Creek. An assessment of potential construction impacts to Jordan Creek from the extraction operation should be provided. This should include information on potential adverse effects on the aquatic environ of Jordan Creek from erosion, siltation and equipment maintenance (fuel and oil spillage). Measures to control these potential impacts to Jordan Creek should also be identified.

Interior Drainage

Appendix I, pages E-75 through E-80, provides an evaluation of the proposed interior drainage protection. The report should provide an assessment of these ponding areas with respect to their adequacy in providing protection for future West Des Moines development. With additional development, urban runoff will increase and this, in turn, may necessitate future interior drainage requirements such as ponding areas, ditches and pump stations. The final statement should address the possibility that following project completion and future urban development adjacent to the ponding areas, these ponding areas may no longer serve their designed function.

Borrow Material

Appendix I, page E-70, states the required borrow material will be supplied from ponding area four and a 44-acre tract of farm land. Plate E-21 provides information on soils from the 52 borings taken in the project area. From this information, it appears that additional levee material could be extracted from the proposed ponding areas three and one, thus reducing the agricultural land consumption for borrow material. The final statement should discuss the possible reduction in farm acreage loss by utilizing these other sites.

Downstream Impacts

Page 14 of the draft statement and page E-63 of the Feasibility Study indicate a minor increase in the flood profile and velocity will occur in the Walnut and Jordan Creek areas. Plates E-14, E-15 and E-16 show water surface profiles with existing conditions. Information on water surface profiles with the proposed improvements should also be presented. The change in the degree of flood protection for Des Moines, resulting from increased flood stages due to this project, should be evaluated in the final statement.

We appreciate this opportunity to comment on the draft statement. Please furnish our office with three copies of the final statement when it is filed with the Council on Environmental Quality.

Sincerely yours,

Jerome H Svore

Jerome H. Svore
Regional Administrator

March 3, 1849

United States Department of the Interior
BUREAU OF MINES
WASHINGTON, D.C. 20240

May 16, 1975

ER-75/314

Memorandum

To: District Engineer, Corps of Engineers, Rock Island, Illinois

Through: Assistant Secretary--Energy and Minerals

From: Director, Bureau of Mines

Subject: Draft environmental statement, Corps of Engineers, West Des Moines-Des Moines, Iowa, Local Flood Protection, Polk County, Iowa

Our Intermountain Field Operation Center, Denver, has reviewed the draft environmental statement prepared by the Corps of Engineers pertaining to a project for local flood protection in West Des Moines and Des Moines, Iowa. Project elements consist of repair of an existing levee and construction of 5 miles of new levees along the north bank of Racoon River, the west bank of Walnut Creek, and the north bank of Jordan Creek within the city limits.

Known mineral resources of the area include sand and gravel and deeply buried thin beds of coal. The statement acknowledges the existence of these resources (p. 4).

Sand and gravel has been mined along the southwestern end of the project area, and three gravel pit lakes occupy about 90 acres. The statement neither mentions these sites nor explains whether sand and gravel is currently being produced near the area. We suggest that the final statement discuss this matter as well as the effect of the project on future production. The deeply buried coal in the area is of little value.

Because the entire project is within the city limits, we believe that construction should not significantly alter the availability of mineral resources in the area.

Director

best copy available

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY
6816 MARKET STREET, UPPER DARBY, PA. 19082
215-597-3772

8400
May 16, 1975

Colonel Walter H. Johnson
District Engineer, Rock Island District
Department of the Army
Clock Tower Building
Rock Island, Illinois 61201

Refer to: NCRED-PB, Draft Environmental Statement, West Des Moines-Des Moines Flood Protection

Dear Colonel Johnson:

Our Milwaukee office referred the above statement to us for review and comment as no National Forest lands are involved.

The Corps has provided for adequate preservation of woodland compatible with the purposes of the project. To enhance natural resources as well as preserve them, the final statement could include plans for establishing wildlife cover where practical.

Thank you for the opportunity to review this statement.

Sincerely,

DALE O. VANDENBURG, Group Leader
Environmental Improvement

United States Department of the Interior
BUREAU OF MINES
WASHINGTON, D.C. 20240

May 16, 1975

ER-75/314

Memorandum

To: District Engineer, Corps of Engineers, Rock Island, Illinois

Through: Assistant Secretary--Energy and Minerals

From: Director, Bureau of Mines

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Because the entire project is within the city limits, we believe that construction should not significantly alter the availability of mineral resources in the area.

Director

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY
6816 MARKET STREET, UPPER DARBY, PA. 19082
215-597-3772

8400
May 16, 1975

Colonel Walter H. Johnson
District Engineer, Rock Island District
Department of the Army
Clock Tower Building
Rock Island, Illinois 61201

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Thank you for the opportunity to review this statement.

Sincerely,

DALE O. VANDENBURG, Group Leader
Environmental Improvement

COMMISSIONERS
JIM D. BIXLER, CHAIRMAN - COUNCIL BLUFFS
THOMAS A. BATES - BELLEVUE
LES LICKLIDER - CHEROKEE
JOHN G. LINK - BURLINGTON
CAROLYN T. LUMBARD - DES MOINES
HERBERT T. REED - WINTERSET
JOHN C. THOMPSON - FOREST CITY

FRED A. PRIEWERT, Director
300 Fourth Street, Des Moines, Iowa 50319
515/281-5145

An EQUAL OPPORTUNITY Agency

May 16, 1975

Colonel Walter H. Johnson
District Engineer
U. S. Army Corps of Engineers
Rock Island District
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

The Iowa Conservation Commission staff was given the opportunity to review the draft environmental statement and feasibility report for local flood protection in the Des Moines-West Des Moines area for the Raccoon River, Walnut Creek, and Jordon Creek. The following comments were received:

1. Certain alignment changes within the levee system would avoid encroachment upon Denman Woods.

2. Present recreational opportunities that are listed does not include snowmobiles. A properly designed and managed multi-purpose trail that includes snowmobiles would provide a link to larger areas outside of the metropolitan area for a large urban population.

3. The planting and seeding programs for the construction areas including the ponding areas would best be served by native plant species.

4. The recommendation for a river access in the vicinity of the 63rd Street bridge is very valid and is a needed recreational facility.

5. The feasibility of extending the levee system around the Martin Marietta sand and gravel operation should be investigated for protection of the future recreation area.

Thank you for giving up the opportunity to review the statement and provide our comments.

Sincerely,

Darrell Hayes

Darrell Hayes
Planning Aide

March 3, 1849

United States Department of the Interior

BUREAU OF MINES
WASHINGTON, D.C. 20240

May 16, 1975

ER-75/314

OFFICE OF THE DIRECTOR

Memorandum

To: District Engineer, Corps of Engineers, Rock Island, Illinois

Through: Deputy Assistant Secretary--Energy and Minerals
MAY 28 1975

From: Director, Bureau of Mines

Subject: Draft feasibility study for flood damage reduction and related purposes, Corps of Engineers, Des Moines River Basin, Iowa and Minnesota

Personnel of our Intermountain Field Operation Center, Denver, have reviewed the feasibility study prepared by the Corps of Engineers pertaining to several plans to provide flood control, water supply, and recreation on streams in the Des Moines River Basin. All projects, except local flood protection for West Des Moines-Des Moines, Iowa, were determined by the Corps of Engineers to be unjustified. The flood protection project consists of repairing an existing levee and construction of 5 miles of new levees along the north bank of Raccoon River, the west bank of Walnut Creek, and the north bank of Jordan Creek within the city limits of West Des Moines-Des Moines, Iowa.

Known mineral resources of the project area include sand and gravel and deeply buried thin beds of coal. The study acknowledges the existence of coal, gypsum, clay, limestone, shale, sand and gravel, and peat in the basin (p. 10) and states (p. E-13) that three gravel pit lakes occupy about 90 acres in a gravel mining area along the southwestern end of the local flood protection area. The study does not explain whether gravel is currently being produced. We suggest that the final study report indicate whether sand and gravel is currently being produced in the area, what resources will be committed, and what effect the project could have on existing and future recovery. Otherwise, we have no objection to the document as written.

Thomas V. Falkie
Director

WHEELER DIVISION

ST REGIS PAPER COMPANY

P.O. BOX 160, 1100 HOAK DRIVE
WEST DES MOINES, IOWA 50265
AREA 515 274-1584

May 16, 1975

U. S. Corps of Engineers
3440 North Division
Rock Island, Illinois 61201

Attention: Colonel Walter Johnson

Gentlemen:

The Wheeler Division - St. Regis Paper Company wants to go on record as protesting the Walnut Creek Flood Control Plan as outlined at the recent West Des Moines meeting.

We certainly feel that there are more logical opportunities to control these flood waters and therefore wish to advise that we vigorously oppose this present plan.

Yours truly,

WHEELER DIVISION

J. M. Hoak

J. M. Hoak
Divisional General Manager

JMH:GMW

THE PATHFINDER COMPANY
WEST DES MOINES, IOWA 50265

1325 Hoak Drive
May 17, 1975

Walter H. Johnson, Colonel
Corps of Engineers
Department of the Army
Rock Island District
Clock Tower Building
Rock Island, Illinois 61201

CERTIFIED MAIL

Re: NCRED-PB

Gentlemen,

We are for flood control for West Des Moines, for all West Des Moines residents and businesses affected by Walnut Creek excessive flows.

As your report now stands, we are not only not to be allowed protection, we will, in fact, be placed in a totally untenable position when the proposed levee entraps us in the flood waters and blocks off our present 800 ft. wier overflow that has relieved us in the past from more backwater. We know our portion of Walnut Creek and its ever-changing flow profile better than anyone else. We have monitored all the flood waters since 1964. It was approximately 1964 that we purchased our property on Hoak Drive. I learned about the property through a West Des Moines Councilman who was also an officer of West Bank where we did our banking. My investigations into the land and its zoning showed that the City government had zoned the area industrial. We assumed the area would be looked on with favor by the city in order to attract industry. We proceeded to plan our building and checked into all available previous flood information from the city and nearby residents. We chose our building elevation to be well above previous flood crests. The plans were approved and building permits were issued by the city.

From the very beginning we took great pride in developing our property. It was a big step for me. There was excitement about the future and having ground I could call my own and develop with my own hands. There were also some apprehensions about future business recessions and possibly not being able to make the mortgage payments and thus maybe losing the whole thing. I remember well the depression years in Coal Valley, Illinois, when my father and his father lost the family farm homestead that dated back to the middle 1800's.

We hired the sanitary sewer installed on the property first. All other improvements have been designed and built by us after our normal working day or during off-season slack times. We could never have afforded to hire or contract the improvements. It was hard work, but I enjoyed most every minute of it for it was fun to experience the good feeling of completing each stage of development and then look forward to the next step. Here, I taught my children how to do many things as we worked on weekends and during vacations. A portion of our property was set aside for "future development" (150 ft x 350 ft.). However, it was meanwhile quickly turned into our baseball diamond and football field for the family and friends. You see, this property is not a scrubby, cold, business property. It's a great part of my life. It was planned that way -- that I would spend the rest of my working days here and upon retirement, could receive retirement income from the present building and develop the "playground" area into commercial business rentals. So, what now? I would like protection too. But, even more, I would like to see a project that solves the flood problem and does not condemn the large areas to becoming silt basins in West Des Moines and Des Moines.

The project, as designed for Walnut Creek, is open to pointed, critical, review and will meet with well informed and vigorous resistance if corrections and change are not made before proceeding.

The following are some points we wish to emphasize about this project:

1. The levee would not protect us, nor would it leave us as we are. It would endanger us and block off our present 800 ft. overflow relief. It would raise the water more than one foot. Even one foot more of water would rapidly multiply our past damage.
   Conclusion: We would be placed in an untenable position by the proposed levee. We don't intend for that to happen.

2. The levee would have a devastating effect on our property valvue. It has already made this property unsaleable except on a distress basis. Computer information, if any exists, on the portion of Walnut Creek between Center Street and Grand Avenue is of little or no value in predicting flood levels. Such information would be very misleading to those awestruck with computer data. The available flow profile in the above area changes yearly, sometimes monthly, and is deteriorating as sediment and debri gather. The proposed project would hasten the build-up of sediment and debri resulting in higher flood levels, with more debri, more sediment, etc. etc. We know your figures for this area are in error if you think we will not experience higher floods because of the levee. We have recently rerun our own survey of the area.

3. The costs benefits ratio formula is not inclusive enough and, therefore, discriminates against me because if I were wealthier and had more dollar damage, I would be worth protecting. If I were to go to court and get an injunction against any further development upstream until the runoff water flow problems created downstream by such developments were solved, then we would have a very interesting increase in benefits ratio using your formula. Other states have, or are considering legislation prohibiting upstream water shed development until the water runoff problems, created downstream by such upstream developments, have been solved and put into effect. The item by item application of this costs benefits formula is discriminating and unfair. The total costs of the project should be applied against the total benefits of the water shed area. An injunction against the cities of Des Moines, West Des Moines, Clive, Urbandale and the county forbidding them to issue any building permits in the upstream area until such time that the downstream flooding is corrected would make for new and urgent considerations with your cost benefit ratio.

4. It doesn't take much research to determine that each time a square block of just new streets is laid out on undeveloped ground that the percolation rate is reduced to zero on 10% of that area and in many developed areas there is acre upon acre of area where the percolation rate is zero and runoff 100%. As the upstream water shed is urbanized, we will be in for more and more trouble if you do not plan to solve the overall problem now

5. The report makes no provision for channel maintenance. This position is unthinkable.

6. It is unthinkable to condemn part of the area between two cities to becoming a silt basin, to flooding the only east - west residential and business street connecting the two towns (exception of I-235), to flooding the only north - south street in Des Moines west of Fleur Drive, to build adjacent to bridges and thus condone their obsolescence which are a known major cause of immediate area flooding, and to allow Walnut Creek to meander throughout the basin.

7. It is known by us who monitored the flood of 1973 that there was definitely a blockage under the Milwaukee Railroad Bridge above Buffalo Road that backed up water in the Clive Industrial Area. At this same time, the water level in our area lowered about three feet. This occurred about 10:45 A.M. At 12:30 our water had risen about six feet. We had not only received the backed up water which had broken out the obstruction, but, downstream, the Milwaukee bridge at Grand Avenue was developing a blockage of serious proportions (we have photographs of a portion of this.) The downstream blockage added to the rapid rise of water here and, of course, then sent the overflow over the 800 foot weir, we spoke of earlier, into residential West Des Moines and the Grand Avenue business section.

8. The flow profiles under the bridges and crossovers of Walnut Creek are not compatable with the needs today. We do not condemn the builders or designers of these structures. Times have changed and their limited foresight is not to be haggled over now. These bridges must be replaced with structures that have flow profiles to pass floodwaters.

9. All of the critical flood crest-water came under the 73rd Street bridge. Had we a waterway with a compatable flowway, there would have been no flooding in West Des Moines or Des Moines in 1973.

10. Let's design a combination channel and levee waterway that is maintained and has bridges to match. If urbanization is to continue in the watershed, impounding areas should be considered as mandatory, desireable, and an asset to the community. I regret the rebuff you experienced in 1971 and 1972 from the Polk County Conservation Board, Dallas County Conservation Commission, and the Iowa Conservation Commission, with reference to the proposed reservior in Dallas County. I know of no other area where the capital city and her sister cities have literally kissed off a valuable area to become a silt basin, and to make matters worse, not compensate the people who were suckered into building in an area that was temporarily zoned "commercial" and/or "industrial" and then zoned to floodplain. I don't think that is the proper way for respected men to treat their fellow man. I do know of many areas where the problem was much worse and a confined flowway was designed that was a combination channel and levee. Development in those areas is now new and fresh and borders along the levee. Gone are the uncontrolled silt basins. I, too, am part of the environment, but, at times, I feel as though I stand a lone. Whereas, if I were to be a special breed of muskrat and this area were my only home, you would take care not to destroy my home or there would be special interest groups seeing to it that you did protect my home. I would like to have my rights respected too and to know that the attention to my needs is not a function of pressure groups, special interest groups, how much noise I make, how valuable my

property is, or how important I am.

11. If my property were to be purchased at a fair projected price and then let the area revert back to a dumping ground for upstream debri and silt basin, I suppose I would have to accept it. But, making this an environmental dump in the heart of a city parallels using cow dung to heal the sick. I would sell right-of-way on the rear of my property (and so would my neighbors) for a well designed channel-levee project. In your report (paragraph 7.013) it states "If future generations opt to expand into the floodway, the project is not an insurmountable obstacle." Let's build it that way now! The present Walnut Creek levee proposal would be a near total loss if we were to go to a channel-levee system later.

12. Any project with approval available right now is many years away from being effective -- five - maybe even seven years.

13. Channel improvement and maintenance right now will minimize flooding in all but exceptional conditions. It is my firm opinion that the 1973 flood in West Des Moines would not have happened had the channel been just cleaned out and the bridge profiles maintained. In reveiwing my records of the fluctuating crests, times, and short durations of crests, velocities in non-channel areas and in data collected from others upstream, I am further convinced of the accuracy of this concept. Future "valve action" by temporary obstructions at the upstream railroad bridge and the downstream railroad bridge will produce needless flooding again and again until these conditions are corrected. The uncontrolled accumulation of debri, silt, river gravel, etc., to depths of five feet or more in the flowway between Center Street and Grand Avenue produce some weird hydraulic gradients that defy calculations but contribute markedly to the backwater and flooding.

14. The time has come for us to not open up wounds which will delay flood protection but, instead, to all in the watershed area to realize we have a stake in the solution of this problem, and since we all are partial contributors to the problems, let us work together and develop a plan that will solve the problems of the entire watershed so that we can know what to expect 20 or 40 years from now. If we can be of help with this project, we wish to do so.

Thanks to the members of the corps that visited us on the morning of May 7th in our warehouse. We will look forward to hearing from you.

Respectfully yours,

C. W. Sharp

CWS;sh

STATE OF IOWA

Office for Planning and Programming

523 East 12th Street, Des Moines, Iowa 50319 Telephone 515/281-3711

ROBERT D. RAY
Governor

ROBERT F. TYSON
Director

May 19, 1975

Colonel Walter H. Johnson
Department of the Army
Rock Island District, Corp of Engineers
Clock Tower Building
Rock Island, IL 61201

PNRS Number 7571049
Draft Environmental Statement and
Interim Draft Feasibility Report
West Des Moines - Des Moines, Iowa

Dear Colonel Johnson:

The Iowa State Clearinghouse has distributed the above-named draft Environmental Statement to those state and other agencies which may have an interest in it. Copies of any comments received from them are attached.

The Iowa State Clearinghouse appreciates the opportunity to have reviewed this statement and to afford other state agencies the same opportunity. As there seem to be no serious objections to the statement, the Clearinghouse is hereby closing its review.

Sincerely,

A. Thomas Wallace

A. Thomas Wallace
Federal Funds Coordinator

ATW/pc

Attachment

STATE OF IOWA

Office for Planning and Programming

523 East 12th Street, Des Moines, Iowa 50319   Telephone 515/281-3711

ROBERT D. RAY
Governor

ROBERT F. TYSON
Director

STATE CLEARINGHOUSE

PROJECT NOTIFICATION AND REVIEW SIGNOFF

Date Received: March 31, 1975   State Identification No: 751049

Review Completed: May 27, 1975

APPLICANT PROJECT TITLE:
Draft Environmental Statement West Des Moines-Des Moines, Local Flood Protection

APPLICANT AGENCY: Walter H. Johnson   Department of the Army
Address   Colonel, Corps of Engineers   Clock Tower Building
District Engineer   Rock Island, Illinois 61201

FEDERAL PROGRAM TITLE, AGENCY AND CATALOG NUMBER: Small Flood Control Projects
Department of Defense
Department of the Army, Office of the Chief of Enginee
Catalog No. 12.106

AMOUNT OF FUNDS REQUESTED:
NA

PROJECT DESCRIPTION:
The project includes the draft environmental statement and the Interim Draft Feasibility Report for a proposed local flood protection project at West Des Moines - Des Moines.

The State Clearinghouse makes the following disposition concerning this application:

☐ No Comment Necessary. The application must be submitted as received by the Clearinghouse with this form attached as evidence that the required review has been performed.

☒ Comments Are Attached. The application must be submitted with this form plus the attached comments as evidence that the required review has been performed.

STATE CLEARINGHOUSE COMMENTS:

Rosalie Redman

Iowa a
to

HE IOWA STATE HIGHWAY COMMISSION · 515-296-1101 · AMES, IOWA

H. E. GUNNERSON
Director – Chief Engineer

D. E. McLEAN
Deputy Director
Deputy Chief Engineer

April 28, 1975

REFER TO:

Letter of Intent
Project: 751049
Corps of Engineers
Des Moines Flood Cont

Mr. A. Thomas Wallace, Jr.
Federal Funds Coordinator
Office for Planning and Programming
523 East 12th Street
Des Moines, Iowa 50319

Dear Mr. Wallace:

I have reviewed the above PNRS Letter of Intent. The project does not appear to conflict with any highway improvements presently programmed by the Iowa State Highway Commission.

Thank you for the opportunity to review this project.

Very truly yours,

T F Jackson
for Robert L. Humphrey
Project Planning Engineer

TFJ/nec

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE CENTRAL REGION
Room 1836
601 East 12th Street
Kansas City, Missouri 64106

June 4, 1975

WFC2x2

District Engineer
Corps of Engineers
Clock Tower Building
Rock Island, IL 61201

Subject: Feasibility Study for Flood Damage Reduction and Related Purposes - Des Moines River Basin

Dear Sir:

The Feasibility Study has been forwarded to us by our Washington Office for reply. We have reviewed its contents and in general we find the items that concern the National Weather Service to be adequate. The following suggestions may aid you in writing your final report:

Page 26, Par. 1: Flood forecasting and warning systems are a non-structural alternative.

Page 54, under Summary: A statement could be utilized as follows: "Flood Forecasting and Warning Services are essential to the design and operation of reservoirs and levees."

Both climate and water should also be considered as natural resources of the basin.

Page C-6, under Improvements: We suggest a brief paragraph as follows:

"The National Weather Service provides the Des Moines River Basin a complete meteorological and hydrologic forecast service. The service provides the earliest possible warnings of severe thunderstorms and flood producing rainfall based on the WSR-57 radar located at Des Moines. It also provides rainfall and river gage networks to warn inhabitants of flooding and to provide historical documents for design purposes."

Page D-17, Par. 44: This paragraph is generally adequate to explain our flood forecasting and warning system. On Line 3 of this paragraph, change "U. S. Weather Bureau" to "National Weather Service".

Sincerely,

Elroy C Balke

Elroy C. Balke
Regional Hydrologist

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VIRGINIA 22092

OFFICE OF THE DIRECTOR

JUL 1975

Colonel Walter H. Johnson
Department of the Army
Rock Island District, Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

We have reviewed the draft environmental statement and feasibility report for Flood Protection, Des Moines River Basin, Polk County, Iowa, and we offer the following comments.

As pointed out by the Corps, chances are that flood protection will induce urbanization and development of the flood plain. For Walnut Creek, flood protection is proposed for the lower reaches of the stream. The Walnut Creek basin is also one of the rapidly urbanizing basins in the State. Hence, flood magnitudes can be expected to increase owing to development throughout the basin. The proposed project, consisting of levees and floodwall, will consequently become even more effective as time goes on. Designing the project to protect against the 200-year flood is a step toward accommodating the higher flood magnitudes of the future that may result from basin development.

Walnut Creek basin is relatively small and is subject to flash flooding. This will pose a serious problem in project operation because of the short time available to make the necessary closures in the levee system. For example, it is noted (p. E-36, feasibility report) that the fast rise in July 1973 resulted in little emergency action being taken. The feasibility report does mention that a flood-warning system will be established. However, no additional information is given on the type of flood-warning system contemplated and how it would operate.

It is noted that one of the alternative levee alignments considered in Section VI has been rejected because it would increase the 100-year flood stages in the residential area on the opposite bank by 2.5 feet, requiring that a levee be constructed around that residential area (p. 21, paragraph 6.066). However, no quantitative estimate has been noted in the draft environmental statement of the impact of the proposed levees on flood levels on the opposite bank. Since levees are proposed only on one side of Walnut Creek, and no existing levees are shown on the opposite bank, which is also developed (Plates E-17 and E-18), it would be advisable to provide an evaluation of this possible impact.

In paragraph 45, p. C-17, of the feasibility report, the April 1965 volume at Saylorville should be 693,410 cfs-days.

Table C-5, page C-28, feasibility report, gives 7-day, 10-year low flow as 200 cfs for the Des Moines River at Des Moines. Our analyses indicate that this flow parameter is about 80-85 cfs for natural conditions. Perhaps the 200 cfs is the expected regulated low flow after the Saylorville Reservoir is in operation.

Paragraph 65, page C-31, feasibility report, should indicate that the sediment loads given are average annual loads.

It is suggested that the 70 acres of flood plain to be occupied by four ponding areas for interior drainage be mentioned specifically in the summary of environmental impacts (first two pages, paragraph 3a). The reference to Section VI on page 19 (paragraph 5.02) should be changed to Section IV. In the glossary definition of Pleistocene, "this is the present geologic time period..." should be changed to "this is the earlier of the two epochs comprising the Quaternary geologic time period..."

Acting Director

City of West Des Moines

MUNICIPAL BUILDING 318-5th
WEST DES MOINES, IOWA 50265
TELEPHONE (515) 255-1161

"CROSSROADS OF THE INTERSTATES"

November 18, 1975

Daniel L. Lycan
Colonel, Corps of Engineers
District Engineer
Clock Tower Building
Rock Island, Illinois 61201

Re: NCRED - PB

Dear Colonel Lycan:

The City Council of the City of West Des Moines, Iowa has been briefed on the current status of the flood protection proposal along the Raccoon River and Walnut Creek, and the recent findings of the Board of Engineers relating to a recommended greater degree of protection.

The City Council expresses disappointment in the processing of the proposed flood control program as submitted and earlier endorsed, because of the length of time that it has taken to afford some relief to our people in this regard. In considering the latest recommendation for an increased level of protection on the Raccoon River and Walnut Creek, our Council unanimously endorsed said proposal and urged that further delays be held to a minimum and that affirmative action be taken by all jurisdictions involved.

A more definitive recreation plan in connection with the flood protection program will be forthcoming in a few days after finalization is determined between the City of West Des Moines and the City of Des Moines.

Sincerely,

Elmer P. True
City Manager

EPT/dn

cc. Pat Burke
John Bryan
Jim Brown

City of West Des Moines

MUNICIPAL BUILDING 318-5th
WEST DES MOINES, IOWA 50265
TELEPHONE (515) 255-1161

"CROSSROADS OF THE INTERSTATES"

November 24, 1975

Daniel L. Lycan
Colonel, Corps of Engineers
District Engineer
Clock Tower Building
Rock Island, Illinois 61201

Re: NCRED - PB

Dear Colonel Lycan:

After considerable study and evaluation, the City of West Des Moines would submit the following as our recreational interests in conjunction with the flood protection proposal for Walnut Creek and the Raccoon River in West Des Moines:

1. Transformation of the present Bennett Addition area into a semi-natural park adjacent the levy and gravel pit on the south of the proposed structure. Development of this area could include:
    - a. Fishing access across the structure.
    - b. Access from the park to a bike path in conjunction with the levy.
    - c. Some picnic equipment in the park.
    - d. Parking to accompany the fishing access.
    - e. Other park development items as necessary and part of a final approved plan .
2. Asphalt bike trail along the Raccoon levy from the above park eastward and linking up with the Des Moines trail system terminating at 63rd Street after serving the city's boating access facility on the Raccoon.
3. Provision of an asphalt biking trail along the levy structure in West Des Moines from Ashworth Road northwest along Walnut Creek a distance of approximately 2,800 feet. This trail segment would coordinate as part of a larger trail system involving the cities of Des Moines and Clive. Thus, any plans upon the part of the City of West Des Moines would also be contingent upon reciprocal actions of our sister cities in the provision of their segments of trail.

It is the city's understanding that all recreational developments in coordination with the levy are on a 50-50 sharing basis with appropriate credits extended to the City of West Des Moines as applicable for lands and damages. The city would operate and maintain all facilities as constructed. Additionally, all plans woul be subject to final review and evaluation by the city prior to signing of any formal documents.

We endorse the recreational concept as proposed and urge that consideration be given.

Respectfully,

Elmer P. True
City Manager

EPT/dn

cc. Pat Burke
John Bryan
Sonya Root

city of des moines

Richard E. Olson, Mayor

November 24, 1975

Daniel L. Lycan, Colonel
Army Corps of Engineers
District Engineer
Clock Tower Building
Rock Island, Illinois 61201

Re: West Des Moines-Des Moines, Iowa
Local Flood Protection Project

Dear Colonel Lycan:

This is to advise you that the requirements of local cooperation for the proposed cities of West Des Moines and Des Moines Local Flood Protection Project at a standard flood protection level, have been presented to the City Council of Des Moines. I have been authorized to notify you that the City of Des Moines will be willing, and legally and financially able, at such time of the signing of a local cooperation agreement between the United States and the City of Des Moines to:

a. Provide without cost to the United States all lands, easements, and right-of-ways, including borrow areas necessary for construction of the project.

b. Hold and save the United States free from all damages due to the construction, operation, and maintenance of the project, except for damages due to the fault or negligence of the United States or its contractors.

c. Maintain and operate at their own expense the completed works in accordance with regulations prescribed by the Secretary of the Army.

d. Make all relocations and alterations of buildings, utilities (except the parts of utilities that pass over, through, or under the protective works and which, if ruptured, would cause adverse effects to the protective barrier or provide a channel for flooding the protected area), and roads, bridges, and other existing structures or utilities where necessary in the construction of the project.

e. Obtain legal control to prevent encroachment on any of the flood protection structures including the ponding areas, and managing all ponding areas to preserve capacities for local drainage.

f. In acquiring lands, easements and right-of-ways for construction of the project, the City will comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970, Public Law 91-646.

g. Make a cash contribution for that portion of the cost of recreational facilities which, when added to cost of recreational lands, would amount to fifty percent (50%) of the total first cost of the recreation lands and recreational facilities.

h. Pursuant to Section 221 of the Flood Control Act of 1970, Public Law 91-611, the City shall grant the Government a right to enter upon, at reasonable times and in a reasonable manner, lands which the City owns or controls, for access to the project for the purpose of inspection, and for the purpose of completing, repairing and maintaining the project, if such inspection shows that the City for any reason is failing to repair and maintain the project in accordance with its assurances and has persisted in such failure after a reasonable notice in writing by the Government delivered to the Mayor of the City. No repair and maintenance by the Government in such event shall operate to relieve the City of responsibility to meet its obligations as set forth above, or to preclude the Government from pursuing any other remedy at law or in equity.

It is understood by the City of Des Moines that a continuous-two-way communication will be maintained between the Corps of Engineers and the City. The purpose of this communication will be to keep the City and the public informed of the study progress and to provide a means for all elements of the community to raise questions and make suggestions concerning the various aspects of the project.

The City of Des Moines is pursuing the adoption of flood plain regulations for areas other than those covered by the plan of improvements, as necessary, to assure compatibility between future developments within the flood plains and the protection afforded by the improvement.

This statement of our position is submitted with the understanding that the $5,537,000 Federal cost estimate and the $393,000 non-Federal cost estimate for the City of Des Moines are preliminary and are subject to refinement as a result of your further planning. We further understand that, at the time the formal local cooperation agreement is requested of the City of Des Moines, we will be furnished a more detailed and firm cost estimate for our review and further consideration. The City of Des Moines reserves the right of final review and consent prior to the initiation of construction on the proposed project.

Sincerely yours,

R E Olson

Richard E. Olson
Mayor

REO/dvb

city of des moines

Office of the City Manager

December 1, 1975

Daniel L. Lycan, Colonel
District Engineer, Army Corps
of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Re: West Des Moines-Des Moines, Iowa Flood
Control Protection Project

Dear Colonel Lycan:

At its meeting of November 24, 1975, by Roll Call No. 5383, the City Council authorized the Mayor to execute a letter on behalf of the City of Des Moines in response to your request that the City provide a letter of intent regarding the standard level of flood protection for the proposed West Des Moines-Des Moines, Iowa Local Flood Protection Project. By that letter, the City agreed to cooperate and would:

> "g. Make a cash contribution for that portion of the cost of recreational facilities which, when added to cost of recreational lands, would amount to fifty percent (50%) of the total first cost of the recreation lands and recreational facilities."

Subsequent to that communication, the Plan and Zoning staff has advised of the results of discussions with the Corps of Engineers relating to the recreation plans for this project. For that reason, it is my understanding that the Walnut Creek Flood Protection Project can also incorporate certain recreation facilities that compliment the overall project and increase its benefits. Subsequent to the aforementioned communication, my office received a request from your office that an additional letter be submitted relating to these recreation facilities.

Please be advised that at the present time, it is the intent of the City administration to recommend to the City Council the participation and construction of those facilities identified by the City Plan and Zoning Commission in conjunction with your staff and when completed, the City will maintain them at the general level of other City recreation facilities.

It is my understanding that the preliminary recreation plan includes a paved boat ramp with access road and unpaved parking lot, and approximately 2.3 miles of paved bicycle paths. It is also my understanding that Des Moines' share of these improvements would be in the neighborhood of $45,000 and in addition to the cost of the City's share of the protection project, which is estimated to be $393,000.

With regard to that portion of the bicycle path from North Valley Drive, north to 63rd Street, its value lies in it being extended as a major northwest bikeway into the communities of Windsor Heights and Clive. In the event that the plan for such a northwest bikeway does not materialize by the time of final plans for the project, the City reserves the right to eliminate this segment of the bikeway as shown within the City of Des Moines.

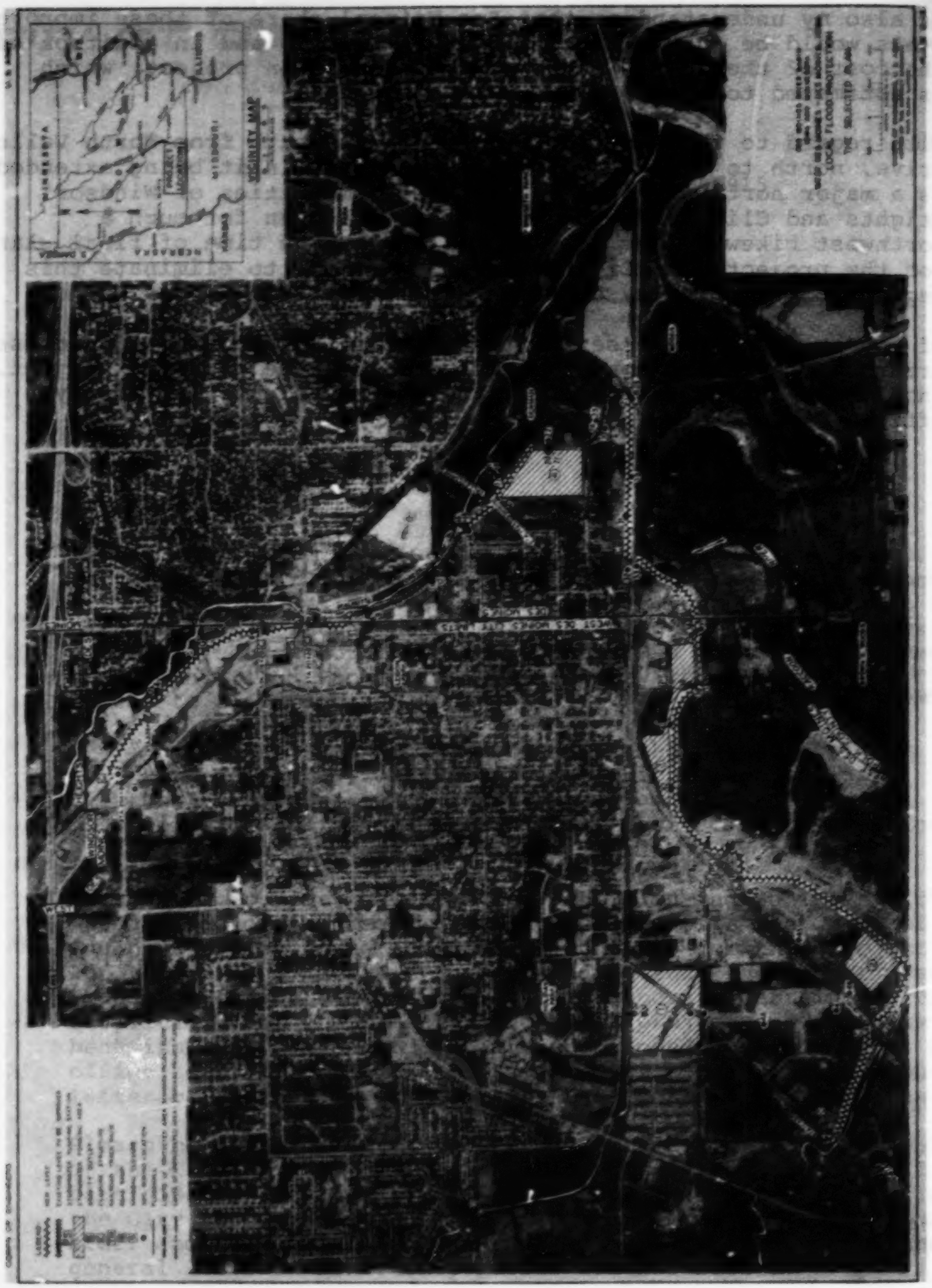
Of course, the City reserves the right of final review and consent prior to the initiation of construction on the proposed project. Should you desire any further information, please contact my office.

Sincerely,

Richard Wilkey

Richard Wilkey
City Manager

RW/dvb



U. S. ARMY
VICINITY MAP
MINNESOTA
NEBRASKA
KANSAS
MISSOURI
ILLINOIS
PROJECT LOCATION
LOCAL FLOOD PROTECTION
THE SELECTED PLAN
CORPS OF ENGINEERS
LEGEND

FINAL ENVIRONMENTAL STATEMENT

SUMMARY

WEST DES MOINES AND DES MOINES, IOWA
LOCAL FLOOD PROTECTION

( ) Revised Draft (X) Final Environmental Statement

Responsible Office: U.S. Army Engineer District, Rock Island
Clock Tower Building
Rock Island, Illinois 61201
Commercial phone: A/C 309 788-6361

1. Name of Action: ( ) Administrative (X) Legislative

2. Description of Action: Flood protection is to be provided to the cities of West Des Moines and Des Moines, near the confluence of the Raccoon River and Walnut Creek, Polk County, Iowa. The project will protect an area of approximately 927 acres from the Standard Project Flood of these watercourses. Project elements include refurbishment of existing levee and construction of new levees along the north bank of Raccoon River, the west bank of Walnut Creek, and the north bank of Jordan Creek, within the city limits of the cities being protected. Four ponding areas are proposed to relieve interior drainage problems. One borrow area is proposed.

3. a. Environmental Impacts: The proposed action will generate both direct and indirect impacts.

(1) Direct impacts

Levee construction will result in direct loss of approximately 32 acres of flood plain vegetation, predominantly woody streamside habitat of significant value as wildlife habitat.

Levee alignment coincides largely with streamside areas of value for outdoor recreation, including hiking, cycling, bird watching, and nature study. Further development and enhancement of facilities for such recreational opportunities has been included as part of the project features.

Four ponding areas for interior drainage will occupy approximately 70 acres of the existing flood plain. A relatively stable ecosystem within the ponding areas is not anticipated because of the cyclic conditions of being wet and dry.

No known historical, archaeological, or architectural sites will be adversely affected by project construction.

(2) Indirect impacts

The flood protection afforded to low-lying lands near the streams will promote accelerated development of commercial, industrial, and residential sites, with resultant losses of woody cover and other vegetation.

Any such development will also displace existing animal life presently occupying such areas.

Contingent upon development and implementation of a land-use plan, with emphasis on outdoor recreational pursuits, the quality of human life should be enhanced, following the flood protection which will be afforded by the project.

b. Adverse Environmental Effects: Adverse environmental effects attributable to the proposed action which cannot be totally avoided are:

The effect on terrestrial biota caused by construction of levees and ponding areas.

The effect on terrestrial biota as a result of land-use changes in flood protected areas.

The aesthetic and recreational impairment of existing trails and natural areas coinciding with levee alignments along or near Raccoon River and Walnut Creek.

4. Alternatives: Alternative solutions consist of:

Flood Plain Management Programs

Nonstructural measures of flood proofing and flood plain evacuation

Structural measures of upstream reservoirs, levee construction, and channel improvements

Combination of structural and nonstructural measures

No Additional Action

5. a. Comments Received (District Review):

U.S. Environmental Protection Agency
U.S. Department of the Interior
U.S. Department of Agriculture
U.S. Department of Transportation
West Des Moines Chamber of Commerce
Martin Marietta Agregates
Iowa State Snowmobile Association
Mid-Iowa Snowmobile Club, Inc.

U.S. Department of Housing and Urban Development
Advisory Council on Historic Preservation
U.S. Department of Health, Education, and Welfare
Iowa State Clearinghouse
State Historic Preservation Officer
City of West Des Moines
City of Des Moines
Des Moines Water Works
Iowa Power
Wheeler Division, St. Regis Paper Company
The Pathfinder Company
W. H. Jamison and Co., Inc.
Mr. R. W. Messerschmidt
Mr. Hubert Frazier
Mr. John W. Patterson
Mr. James E. Horan
Mr. Clark A. Colby
Ms. Vivian L. Haag

d. Comment Received (Departmental Review:

U.S. Environmental Protection Agency
U.S. Department of the Interior
U.S. Department of Agriculture
U.S. Department of Transportation
U.S. Department of Housing and Urban Development
State of Iowa, Office of the Governor
Iowa Conservation Commission

6. Draft statement to CEQ: 4 April 1975
Revised draft statement to CEQ: 16 August 1976
Final statement to EPA : 31 MAY 1979

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I PROJECT DESCRIPTION

1.01 General

1.011 The selected plan for flood protection of West Des Moines and a portion of Des Moines recommends protection by physical structures. These structures will consist of new earthen levees, upgrading of existing levee, outlet structures, closure structures, pumping plants, and ponding areas to handle interior drainage. These features are graphically displayed on Plate E-19 and engineering details are given in the project report*. Modification of transportation facilities and utilities will also be structural features associated with the project. Borrow areas for earthen material are also considered as features of the project.

1.012 The proposed project and the area to be protected is located along the left bank of Jordan Creek, the left bank of Raccoon River, and the right bank of Walnut Creek within the cities of West Des Moines and Des Moines, Iowa, as shown on Plate E-19. The specific project area, in the flood plain, is in a transition zone between two existing land use patterns. Extending into the flood plain is the highly urbanized area of West Des Moines and Des Moines. In contrast, the lowest portions of the flood plain still retain features of a more or less undisturbed flood plain. Denman Woods, Brown's Woods, and adjacent environs along Walnut Creek and the Raccoon River emphasize the transitional land use patterns as shown on Plate E-19.

1.013 Flooding within the Des Moines River Basin prompted local interests to request congressional representatives to authorize a study of the basin's flood problems. A resolution adopted by Congress in June 1945 directed the Corps of Engineers to review previous reports to find a feasible plan for flood control and related purposes. A second resolution adopted in July 1958 authorized a review of an earlier report investigating feasible improvement for flood control and related purposes on the Des Moines Basin. The proposed project is presently in the pre-authorization study stage.

1.02 Physical Features

1.021 The most prominent features of the proposed project will be 5 miles of earthen embankment flanking the right bank of Walnut Creek and the left bank of the Raccoon River and Jordan

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* Feasibility Study for Flood Damage Reduction and Related Purposes, Des Moines River Basin, Iowa and Minnesota. Rock Island District, US Army Corps of Engineers, June 1975.

Creek. Starting at the southwest tie-back (Station 0+00) the levee alignment will run in a southeastwardly direction along Jordan Creek into the Raccoon River flood plain. At about Station 30+90 the levee assumes a northeasterly alignment to about Station 146+00. From this point the alignment is generally in a northwesterly direction along Walnut Creek to the tie-back at Station 254+40. As cited the main protection feature will be an earthen levee along the alignment as described. However, a short portion of the protection structure, extending north and south of Grand Avenue will be concrete wall. This wall will be about 600 feet in length.

1.022 Maximum height of the earthen structure will be 24 feet with an overall average height of 14 feet. Average base width will be 94 feet. The side slopes will be 3H on 1V with a crown width of 10 feet.

1.023 It is not proposed that the entire earthen levee will be new construction. Between Station 146+00 and Station 166+00 and between Station 183+00 and Station 204+00 levee construction will consist of raising the existing levees.

1.024 At eleven points along the alignment permanent structural features or temporary methods are envisioned to affect closure during flood periods. Such closures are necessary where various rail or highway facilities intersect with the levee structure. A gated closure is required near the southwest tie-off at Fuller Road. At Station 19+50 rail lines will have a gated closure while the adjoining roadway will be ramped over the levee. At Station 60+00 another gated closure will be necessary for the spur line serving the gravel pits while an adjoining roadway will be ramped over the levee. A gated closure is proposed for 63rd Street at Station 106+50. A gated closure will be provided across a double railroad track at Station 120+00. Valley Drive will be raised and ramped over the levee. Where 63rd Street again intersects the levee a sandbag closure will be required. A gated closure will be provided at Grand Avenue as well as for the road and railroad at Ashworth Road. Hoak Drive will be raised and ramped over the levee at Station 239+60. Near the tie-off, Station 254+40, a gated closure will be required for a rail line. Further design detail of the gated closures, road ramps, and other related features are shown in the project report.

1.025 Four ponding areas will be required to handle excessive interior drainage. Location of these ponding areas are shown on Plate E-19. During maximum ponding conditions, approximately 70 acres will be required. These ponding areas are naturally low areas within the protected area of the project. Water storage in the ponding area will generally be of a temporary nature.

1.026 To handle other facets of interior drainage, 12 gravity outlet structures will be constructed throughout the protection system. These structures will be gated and design detail is shown in the project report. The location of these structures is shown on Plate E-19.

1.027 Three pumping plants will be required to evacuate interior drainage. These pumps will have capacities of 70, 104, and 27 cfs respectively.

1.028 It is estimated that 966,000 cubic yards of material will be needed to construct the earthen levee. This material will be obtained from ponding areas 2 and 4 and a borrow area (Plate E-17) located 2.5 miles from the project and encompassing about 44 acres of land.

1.029 After completion of the project positive steps will be taken to improve visual aesthetics and reduce the potential for soil erosion. After final shaping and grading of the earthen levee the structure will be seeded with appropriate grasses and legumes to establish a permanent sod cover. Landscape plantings will be made, as appropriate, at the various highway closures. Foundation or screen planting will be made at the pump stations. Landscape treatment will be considered at each of the ponding areas where feasible and desired by local interest. Basic landscape concepts of screening, beautifying, and creating diversity of the landscape and enhancement of wildlife habitat will be employed. Where practical, landscape treatment will be intermeshed with recreational opportunities.

1.03 Social-Economic. The proposed project will provide flood protection for 922 residential homes, 143 commercial firms, and 22 light industries. Annual charges computed at an interest rate of 6-1/8 percent over the project life is estimated to be $495,467. Benefits expected to accrue from the project consist mainly of reduction in annual flood damages. However, recreational development costs and benefits associated with the project are also included. Projected development in the protected area will generate additional benefits over the project life; thus total average annual benefits are estimated to be $1,168,900. The benefit-to-cost ratio is 2.36 to 1.0. More detailed economic data is provided in Appendix D.

II ENVIRONMENTAL SETTING WITHOUT THE PROJECT

2.01 PHYSICAL ELEMENTS

2.011 Geology. Geological deposits in this area are dominated by materials of glacial origin, including the Nebraskan, Kansan, and finally the Wisconsin glacial advances. Glacial deposits of calcareous and loamy materials were deposited to depths of 30 to 60 feet. These materials have been largely obscured by wind-deposited loessial materials during the intervening 12,000 to 13,500 years. Purely within the flood plain, flooding and resulting alluvial materials have displaced or covered the loess. Underlying all these materials is bedrock shale from the Des Moines series of the Pennsylvanian system. Thin veins of coal and interbeddings of sandstone and limestone occur within the shale bedrock in this area. No outcroppings of shale occur within the project area but occasional bedrock exposures occur on nearby hillsides.

2.012 Physiography.

2.0121 The West Des Moines and Des Moines, Iowa, Local Flood Protection project is situated principally between the Raccoon River to the south and Walnut Creek to the east and north. West of the confluence of these two streams the Raccoon River flood plain averages about one mile in width, and its valley is well defined. The Walnut Creek flood plain is relatively narrow. The generally level flood plain near the confluence of these streams grades into terraces along its margins, creating benches and reflecting the erosive effects of past floods. Moderate-sized bluffs of 100 to 200 feet occur north of Walnut Creek in this sector and occur along Brown's Woods and adjacent lands south of Raccoon River.

2.0122 The flood plain dates back to the late Pleistocene but has been continuously modified by more recent alluvial action. Extensive glacial deposition surrounds the flood plain.

2.0123 The project area is heavily urbanized, with the flood plain virtually covered by residential, commercial, or industrial development. This, in turn, has rendered much of the flood plain no longer capable of absorbing runoff, thus further compounding the flood problem.

2.013 Soils. Soil types in the project area are typically alluvial in nature. They include extensive areas of Cooper silt loam; Dorchester silt loam, deep over sand; Marshan silty clay loam, deep over sand and gravel; Huntsville silt loam; and riverwash. The subsoil horizon, occurring below 30 to 60 inches of alluvial soil, is generally represented by another 30 to 60 inches of sand or gravel. These sand and gravel deposits are extensive, and commercial mining and stockpiling of these products is an important industry within the project area. Soil drainage is highly variable--from excessively drained in some instances, to imperfectly drained in others. The alluvial soils along Raccoon River are generally neutral to slightly acidic.

2.014 Climate. The average annual rainfall is about 31 inches. Nearly 22 inches of this occurs during the 171 day growing season, late April into early October. Average date of the last spring frost and first fall killing frost is 21 April and 3 October, respectively. Temperatures have ranged from a low of -21°F to a high of 105°F with an average annual temperature of 50°F. Average annual snowfall is 30 inches.

2.015 Air Quality

2.0151 The Environmental Protection Agency has divided the United States into 247 Air Quality Control Regions (AQCR's) for the purpose of delineating areas with homogenous air quality. The five types of pollutants considered in each region include suspended particulates, sulfur dioxide, carbon monoxide, nitrogen oxides, and oxidants. Each AQCR is given a priority category with regard to each type of pollutant based on the severity of pollution, either directly measured or estimated. Priority categories range from one (most severe pollution problems) to three (no problems).

2.0152 AQCR Number 92, including Polk, Jasper, Warren, Marion, and Monroe Counties, is classified priority one for suspended particulates and oxidants, and priority three for all other pollutants. In 1974, ambient air monitoring stations in Des Moines, operated by the Iowa Department of Environmental Quality, exceeded EPA standards for 24-hour concentrations of suspended particulates, carbon monoxide, and oxidants on some sampling days. Data collected are greatly influenced by pollutant sources characteristic of urban areas such as industrial sources and vehicular traffic.

2.016 Hydrology.

2.0161 Surface Water.

2.01611 Walnut Creek enters the Raccoon River near the western edge of Des Moines. It drains approximately 85 square miles. Surface water records prior to October 1971 are not available. An estimated flow of 9,000 cubic feet per second (cfs) occurred on 1 July 1973. Minimum daily flows of 0.07 cfs was recorded on 12 and 17 October 1971. The 100-year frequency flood has been calculated at 17,000 cfs.

2.01612 Flooding along Walnut Creek is frequent. Peaks tend to be high, but brief. The stream has a long record of troublesome flooding within both West Des Moines and Des Moines. Storm sewers from Des Moines drain into Walnut Creek within the project area. About a mile of existing flood levee largely parallels the creek, from Grand Avenue to the Chicago and North Western Railroad track. Interior runoff enters the Des Moines River via Raccoon River, which receives Walnut Creek flows at the eastern extremity of the project.

2.01613 The Raccoon River is a major tributary of the Des Moines River and it has a drainage area of 3,640 square miles. The nearest gaging station to the project area is at Van Meter, Iowa, about 32 river miles upstream from the project area. No important tributaries enter the river downstream to Walnut Creek. Drainage area above the gaging station is 3,441 square miles. Flow records at Van Meter have been maintained since 1915. Maximum discharge during this period was 41,200 cfs (13 June 1947). Minimum daily discharge was 10 cfs (22-31 January 1940). Average discharge during the 57 year period of record through September 1972 was 1,215 cfs. The 100 year flood discharge for the Raccoon River at the project area has been calculated at 59,700 cfs. River profile, grade, large drainage area and other characteristics result in extreme flood conditions over extended periods. Great damage periodically results in the West Des Moines and Des Moines sector. Fortunately, timing of floods between Raccoon River and Walnut Creek does not usually coincide.

2.01614 Jordan Creek enters the left bank of the Raccoon River about one mile upstream of 63rd Street. It drains about 13 square miles. Surface water records are not available. The 100-year frequency flood as determined by synthetic hydrologic methods is estimated at 7,900 cfs. There is essentially no development within the Jordan Creek flood plain upstream of Fuller Road. Downstream of Fuller Road the flood plain area, which is zoned industrial, is subject to Raccoon River and Jordan Creek flooding. Flooding into the sparsely developed industrial area is limited by spoil bank levees along both banks of Jordan Creek.

2.0162 Ground Water. The Raccoon River valley supplies water for one of the largest water infiltration galleries in the world. Until 1950 it supplied the public water supply needs of the Des Moines area. The sands and gravel deposited in the Raccoon River valley are saturated with ground water, about 90 percent of which infiltrates from the Raccoon River, with the balance coming from rain or snow. Underlying this aquifer is an impervious layer of blue clay. The city water collection gallery is some three miles in length, four feet in diameter, and is situated parallel to the Raccoon River, about 150 to 300 feet from the main channel. Since 1950, water supply for Des Moines has been augmented by direct pumping from the Raccoon River.

2.0163 Water Quality.

2.01631 No intensive water quality studies of the Raccoon River or Walnut Creek have been accomplished. Information provided by the Iowa Department of Environmental Quality indicates that there are about seven sampling stations within the Des Moines area. However, one station has not been sampled since 1962 and five stations have only been sampled from one to three times beginning in 1973. Only one station, the Jackson Street Bridge on the lower Raccoon River near its confluence with the Des Moines River, has been periodically sampled with some consistancy since 1972. Parameters tested have been limited to temperature, turbidity, dissolved oxygen, biological oxygen demand, nitrogen, chloride, and phosphorus. The parameters tested have remained within Iowa state standards for the most part and reflect seasonal variations.

2.01632 From a biological standpoint, the presence of a relatively good fishery resource in both the Raccoon River and Walnut Creek would indicate that water quality would be generally fair to good.

2.02 BIOLOGICAL ELEMENTS

2.021 General. Project lands exhibit a typical flood plain ecology in those sectors still subject to flooding. Some areas have been flood proofed by existing levees, roads, or urbanization. The vegetation in these areas is entering successional stages more typical of a moist woods situation. The general area supports an excellent variety of woody and non-woody plants. Fish and wildlife is well represented.

2.022 Botanical.

2.0221 Plant communities within the project area have evolved largely in a typical flood plain situation. Plant speciation reflects this condition. Except for about 200 acres of agricultural land, most of the vegetation is represented by herbaceous plants or lowland woods. Previously cleared areas are generally vegetated with various species of herbaceous plants or grasses.

2.0222 Disturbances by man, including grazing, agriculture, construction activities, and general activities have greatly altered plant speciation and distribution in much of the project area. The largest remaining naturally wooded area in this vicinity is Charles S. Denman Woods. Most of this 1,500 acre area is administered as a natural area by the Des Moines Water Works Department as Waterworks Park. This action has preserved the beauty and rich natural values of the area. A portion of the west edge of Denman Woods extends into the project area, principally along the Walnut Creek levee alignment.

2.0223 Wooded areas within the project are generally limited to the most flood prone situations, where agriculture or urbanization have not yet encroached. Streambanks and adjacent lands, existing levees and scattered small areas support a great variety of deciduous woody species, along the Raccoon River, Walnut Creek, and Jordan Creek. Younger trees prevail. Healthy, nearly pure, stands of such species as slippery elm, green ash, black walnut, hackberry, and bur oak occur in several areas. American elm has been virtually eliminated from the area by Dutch elm disease. These flood plain woodlands generally have a limited understory which tends to be open and park-like. The more common shrub species include greenbrier, coralberry, gooseberry, and elderberry with a variety of herbaceous plants, mainly annuals.

2.0224 Disturbed areas, including reverting fields, roadsides, vacant lots, and old gravel and sand pit areas are generally well vegetated with a great variety of herbaceous plants and grasses. Typical herbaceous plants include curl dock, nettle, pepperweed, prairie-clover, tick-trefoil, jewel weed, milkweed, goldenrod, ragweed, thistle, sunflower, and common dandelion. Grasses include Kentucky bluegrass, quackgrass, yellow foxtail, and dropseed.

2.0225 Aquatic vegetation is minimal in the project area. This is primarily due to existing turbidity and siltation in Raccoon River, Walnut Creek, and Jordan Creek and resulting turbidity in the gravel and sand pit lakes from ongoing mining operations.

2.0226 The showy orchis (Orchis spectabilis) is officially listed as an "Endangered Species". Specimens are present in nearby Browns Woods and Denman Woods but no showy orchis are known to occur within the project boundaries.

2.023 Zoological

2.0231 Habitat provided by the Raccoon River, Walnut Creek, Jordan Creek, and the gravel pit lakes supports a variety of fish species. The predominant species include catfish, carp, bullhead, sunfish, crappie, white bass, smallmouth bass, and sucker. This resource provides an enjoyable recreation opportunity in the form of sport fishing for many of the area residents.

2.0232 Wildlife populations are heavily oriented to the wooded sectors of the project area. Variety of bird life is rich, with speciation especially varied in Denman Woods. The Des Moines Audubon Society has maintained statistical records since 1959, with most of their observations centered in or around Denman Woods. Their Polk County checklist includes 287 species, most of which migrate through or are residents of the project area. The species checklist is available for review from the Rock Island District office.

2.0233 Mammals are well distributed throughout most of the project area. Raccoon River, Walnut Creek, and the gravel pit lakes provide excellent travel lanes which are well used by raccoon, mink, and deer. Fox squirrels, gray squirrels, muskrats, foxes, opossums, woodchucks, and a number of the smaller rodents add variety to the landscape. The fox squirrel is the most commonly observed mammal in the project area.

2.0234 Reptiles and amphibians are well represented, especially in or near the water courses or the pit lakes. Snapping turtles, softshelled turtles, painted turtles, bullfrogs, leopard frogs, and toads are commonly observed. Snakes include the bullsnake, fox snake, garter snake, and the western ribbon snake. At least 28 species of reptiles and amphibians have been recorded in or around the project area.

2.0235 Two fish species once present in the project area are classified as "rare" by the State of Iowa. These are: (1) Blacknose shiner (Notropis heterolepis) and (2) Western sand darter (Ammocrypta clara). These species are also on the National list of "Threatened Fishes of the United States." Both species appeared in collections in the project vicinity prior to 1948 but their current status in the area is unknown. No species of mammal, bird, reptile, or amphibian credited to the project area appears as endangered or threatened by the Department of the Interior or the State of Iowa.

2.03 HUMAN ELEMENTS

2.031 Transportation. The project area is bisected north-south by 63rd Street, a major urban artery which also serves as the boundary between Des Moines and West Des Moines. Immediately north of the project area the Des Moines Freeway No. 235 crosses

Walnut Creek before continuing eastward, thence north to tie with the east-west Interstate 80 and the north-south Interstate 35. Braniff, Ozark, and United Airlines provide service to the Des Moines Municipal Airport located about 2.5 miles southeast of the project area. Greyhound buslines also provide passenger service into the Des Moines-West Des Moines area. The Chicago, Milwaukee, St. Paul, and Pacific Railroad provides freight service, including trackage closely paralleling Walnut Creek. In addition, the Chicago, Rock Island, and Pacific, together with the Chicago and NorthWestern Railroad service the southern portion of the project area, with extensive trackage along Railroad Avenue.

2.032 Economy of the Area. Des Moines is the capital of Iowa and the county seat of Polk County. The local economy is heavily dependent upon activities relating to state or local government. The main offices of several large insurance companies are located in the Des Moines area. Drake University, one of Iowa's largest universities is also located in Des Moines. Located in the farm belt, this region produces an abundance of agricultural crops and livestock. Farming is the primary industry in the region. Polk County is the leading source of sand and gravel within the State of Iowa and considerable deposits are located within the project area. Local sand and gravel operations as well as cement production do occur within the project area. There is no water-based transportation and the trucking industry or rail freight move most of the agricultural products to other markets. Only limited manufacturing occurs and most area products are either consumed locally or shipped to other points for further processing.

2.033 Population. Des Moines is the largest city in Iowa, (1970 population: 201,404). West Des Moines' 1970 population was 16,441. Settled in 1843 as Fort Des Moines, the community grew rapidly and by 1857 it was designated the State Capital. The annual growth rate since 1950 has been less than that experienced prior to 1950. Population for both cities is expected to increase in the future. The population of West Des Moines is expected to reach 28,000 people by the year 2020. Without the project, most of this increase would be in areas zoned residential located on land elevations higher than those typical of the flood plain.

2.034 Public Facilities. Primary facilities in the West Des Moines and Des Moines Local Flood Protection area include water supply, storm water collection, city streets and thoroughfares, and city parks. Secondary facilities include police and fire protection, schools, and city buildings.

2.035 Recreation.

2.0351 Outdoor recreation is an important activity in the project area. Unorganized activities include sport fishing in Raccoon River, Walnut Creek, and Pit Lake. Bird watching, nature photography, and mushroom hunting are very popular, especially along existing levees and other wooded areas. Hiking, jogging, bicycling, trail-biking, and nature study are other popular pastimes. Canoeing and boating opportunities are limited by lack of good access into Raccoon River.

2.0352 An important playground area consisting of 10 or 11 baseball and softball diamonds is located in West Des Moines between 11th and 14th Streets just north of Maple Street. Babe Ruth League baseball and other organized and unorganized baseball and softball is played on these diamonds. West Des Moines has plans for expanded outdoor recreational facilities within the project area, especially in connection with the proposed ponding areas and the Martin-Marietta pit lakes area.

2.0353 Brown's Woods, immediately south of the project area, and Denman Woods to the east, each provide great opportunities for nature study in surroundings largely unchanged by man. Brown's Woods is in the process of being established as a component of the Polk County Conservation Board's system of parks and natural areas and is expected to remain a primitive area. Denman Woods has been operated as the city of Des Moines' Waterworks Park for nearly 50 years. It receives heavy use by fishermen, picnickers, campers, bird watchers, nature study groups, bicycle riders, horseback riders, and other outdoor enthusiasts. Most of the area remains natural and unchanged. Although much of Denman Woods is served by bicycle trails or bridle paths, the northwestern portion which penetrates the project area remains relatively devoid of such trails, save for portions of the existing levee along the west side of Walnut Creek. This levee section receives heavy recreational use.

2.0354 The Central Iowa Regional Planning Commission in their report entitled Initial Central Iowa Outdoor Recreation Plan, dated February 1972, recommended development of an urban trail along the full length of Walnut Creek from the Raccoon River through Des Moines, West Des Moines, and the western suburbs. The report also indicated a 10,260 acre deficiency of recreational lands by the year 2,000 A.D. The Polk County deficiency was by far the greatest projected for the eight county area. The greatest need for recreational lands in Polk County is for Class III (Natural Environment) lands, according to the cited report.

2.0355 Outdoor recreational use generated in this metropolitan area of 217,845 people (1970 census) is great and steadily increasing. According to Des Moines' Waterworks Park personnel, all new facilities tend to be promptly and heavily utilized. The West Des Moines and Des Moines Local Flood Protection Project involves an essential link in a highly valued river corridor. The final project plan is being geared to incorporate appropriate safeguards to preserve and enhance the integrity of these rich, natural values.

2.036 Historical and Archaeological Sites.

2.0361 An intensive archaeological, historical, and architectural survey of the planned project area was completed in October 1974 by the Environmental Research Company, Iowa City, Iowa. The findings are detailed in their Research Report No. 9, and may be reviewed in the Corps of Engineers, Rock Island District office.

2.0362 No new archaeological sites were located within the flood plain, but one bluff site previously destroyed by West Des Moines urbanization is located near Ashworth Road and 9th Street, West Des Moines. It represents the maximum southern penetration of the Great Oasis Culture into the lower Des Moines River Valley. It appears likely that other sites may yet be discovered in this area.

2.0363 Of the aboriginal manifestations recorded within an approximate 10 mile radius of the West Des Moines project area, 13 (or 36%) were designated as an Oneota manifestations, 8 (or 22%) were tentatively assigned a Woodland Cultural Association, 1 site (or 3%) of the total had an historic component associated, 1 (or 3%) was designated as an Archaic site, and 13 (or 36%) were culturally unidentified.

2.0364 There are a number of buildings of historical or architectural significance in or near the project area. One site, designated Historical, is a private home built in two stages during the 1850's and 1870's. It was associated with important personages and events in early Iowa history. This West Des Moines site, the Jordan House, is located on the north side of Fuller Road near South 19th Street. It is about 700 feet west of the western extremity of the levee segment which flanks Jordan Creek. Located just outside the project boundaries, care will be taken to avoid damaging this site, which is listed on the National Register of Historic Places.

2.0365 Ten architectural sites, all within the West Des Moines portion of the project area, have been accorded the status of inclusion in the list of the Iowa Inventory of Historic Places. All of these sites are north of Railroad Avenue and West of 63rd Street and will be protected by the planned levee.

III RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS

3.01 Commercial and Industrial Development

3.011 Close coordination has been in effect on a continuing basis with West Des Moines and Des Moines since the project formulation stage. Both cities have indicated general consonance of the proposed project with city land use plans for the future.

3.012 Des Moines City Council has initiated a request, approved by the Zoning Commission, to amend the city zoning ordinance by inclusion of a new section: Floodway Districts. This will pave the way for various actions designed to keep the project compatible with Des Moines' land use plans while assuring utmost floodway efficiency.

3.013 The first stream the city of Des Moines plans to establish Floodway District boundaries along is Walnut Creek. The city of West Des Moines is also planning to amend the city zoning ordinance to incorporate the requirements of the Flood Disaster Protection Act of 1973. Coordination of the establishment of a preliminary Walnut Creek floodway and the purposed flood control project has been maintained throughout the study between the Corps of Engineers, Iowa Natural Resources Council, and the city governments of Des Moines and West Des Moines.

3.014 Project formulation included consideration of West Des Moines and Des Moines proposals to make the project compatible with future land use plans in the two cities.

3.015 Iowa Conservation Commission has an agreement with Martin-Marietta Company for a future 200-acre lake between Jordan Creek and 63rd Street in the area between the planned levee and Raccoon River. This plan has been considered in project formulation and does not appear inconsistent with other project purposes. The project may, in fact, complement lake development planning.

3.016 Exact ponding area and borrow area locations remain subject to various land use considerations in vogue at the time of final plan formulation. Some adjustments will likely be necessary.

3.017 The city of West Des Moines has completed a new comprehensive land use plan, complete with zoning needed to assure the greatest economic benefit to the city. This land use plan has resulted in the city requesting slight modifications in the planned levee alignment.

3.02 Recreation and Open Spaces

3.021 Through their own planning and management efforts the local interests have recognized the need and demand for providing recreational opportunities and open space. Through coordination with the local sponsors facilities for bicycling, hiking and walking, picnicking, nature study, bird watching, and fishing access have been included in the project. These facilities will generate additional recreation use and participation within the levee corridor and will augment and enhance existing recreational development within the project area.

3.022 In summary, the project is an appropriate and logical vehicle for expanding recreational opportunities and is consistent with local, State, and Federal land use policies.

3.03 Transportation. Ground transportation in this urban area is dependent upon city buses, taxicabs, and privately-owned motor vehicles. A good system of city streets and highways, together with the interstate system (I-80, I-35, and I-235) provides the basis for reliable movement of motorized vehicles through this metropolitan area. Protection of the project area from flooding will promote more reliable movement of people and goods. There is nothing in the project plan which would reduce the effectiveness of the present transportation system.

3.04 Coordination. Coordination efforts with land use planning agencies is expected to continue. Recommended changes will be incorporated in the project plan wherever appropriate, to assure greatest possible consonance with local land use plans and policies.

IV THE PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

4.01 Introduction. There will be both direct and indirect effects imposed by the project upon the environment. Construction of levees and ponding areas will have a direct effect on the area's biota, both plant and animal. Protection from flooding will result in secondary effects occasioned by the resulting industrial, commercial, recreational, and residential changes which are made possible.

4.02 Direct Environmental Impacts

4.021 Geology-Soils. The project will require 823,000 cubic yards of material from the 44-acre borrow area; 78,000 cubic yards of material from ponding area 4; and 65,000 cubic yards of material from ponding area 2. With the exception of the materials removed from these areas for construction of the levee, the project will not directly affect the soil resources within the project area.

4.022 Physiography. No significant alterations to the physiography of the area are anticipated. The physical levee structure will produce a visual contour change from the relatively flat, level flood plain that presently exists.

4.023 Climate. No basic climatic changes are expected as a result of the proposed project.

4.024 Hydrology.

4.0241 Construction of the levee and floodwall will have a minimal effect upon the existing hydrologic and hydraulic characteristics of Walnut Creek, Jordan Creek, and the Raccoon River. No increase in frequency or duration of flood flows is expected. A minor increase in flood profile and velocity for large floods is anticipated in the Walnut Creek and Jordan Creek areas, however, the profile increase is within the standards and criteria established by the Iowa Natural Resources Council.

4.0242 The borrow area will be too far removed from the project and the stream to have any impact upon the hydrology of the streams. It is located on high agricultural land, virtually noncontributing to the local drainage pattern. After use, it will be graded and seeded to control erosion with the drainage pattern essentially unchanged.

4.0243 Water Quality. Levee construction will result in soil erosion, with short-term impacts upon the aquatic community--principally in Walnut Creek. The levee site along Raccoon River is too far removed from the stream to produce this effect. This impact is expected to be of short duration and no significant changes in the existing water quality is expected as a result of the project.

4.025 Biological Elements.

4.0251 Construction of the new levee and floodwall and upgrading of the existing levee will destroy approximately 22 acres of existing vegetation and wildlife habitat along the immediate alignment. Most of the damage will occur along the Walnut Creek sector of the levee and particularly along the northeast perimeter of Denman Woods. Development of the levee may also interfere with some existing wildlife movement and travel lanes within the project area. No species listed as endangered or threatened by the Department of the Interior* are expected to be affected by the proposed project.

4.0252 The proposed ponding areas have very limited value botanically or as wildlife habitat. They lack woody cover and the limited herbaceous cover is relatively unproductive for wildlife. A relatively stable ecosystem within the ponding area is not anticipated because of the periodic, cyclic conditions of being wet and dry.

4.0253 Approximately 44 acres of present agricultural land will be lost by use of the borrow area. The future use of this area is unknown and therefore the significance of this impact is difficult to evaluate.

4.0254 A temporary adverse impact on the aquatic communities along Walnut Creek is expected. Increased siltation and turbidity caused by erosion from construction activities will likely occur. This will be a localized problem of short duration and should not significantly affect the future aquatic resources within the project area.

4.0255 Additional problems associated with air and noise pollution can be anticipated during the construction period. The contractor will be responsible for complying with all Federal, State, and local standards regarding these problems.

4.026 Aesthetics.

4.0261 Properties bordering the levees are either commercial, industrial, railroad, or street rights-of-way in virtually all instances. The Raccoon River and Walnut Creek are largely inaccessible for public viewing or enjoyment throughout most of the area. The levee alignment along Walnut Creek offers a good view of that stream from North Valley Drive to Grand Avenue. This levee segment has a well-defined trail and is heavily used by hikers, bicyclists, and other outdoor recreationists. The natural corridor provided by the existing levee can be expected to be further extended with the new levee segments. The levees will provide an overview of the two streams, and ultimately of the pit lake which will be developed on the Martin-Marietta property.

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* Endangered and Threatened Wildlife and Plants, Fish and Wildlife Service, Department of the Interior, Federal Register, Vol. 41, No. 208, 27 October 1976.

4.0262 There are virtually no residences with a view to the river. Railroad grade or natural screening has cut off the view of those few homes which might otherwise overlook the Raccoon River. Hence the levee will not interrupt the existing river view.

4.0263 During the relatively brief periods they store water, the ponding areas will significantly alter the appearance of the area. The relatively bare ground will be transformed into open water. Any aesthetic change will be largely in the eye of the beholder. Outdoor sports and other recreational uses which are expected to concentrate in these areas during dry periods will generally involve younger people at play. This is usually considered aesthetically pleasing and must be considered a beneficial effect.

4.0264 The aesthetic appearance of the borrow area will probably be relatively neutral. It will be shaped and seeded until such time the future use of the area is determined.

4.0265 Seeding of the levee should help enhance the appearance of the levee as well as provide erosion control. Landscaping and beautification will provide screening of project features and will help break the straight line contour of the levee. Plantings will partially offset losses to existing vegetation and wildlife habitat.

4.027 Transportation and Public Facilities. With the exception of possible temporary interruption of local traffic during construction activities, the project will not alter transportation systems or facilities. Flood protection will assure uninterrupted access and services that would benefit both local and regional economy. Protection of such facilities would also mean less maintenance costs and work for clean-up and repairs that normally occur after periods of flooding.

4.028 Economy of the Area.

4.0281 Tangible benefits of this project consist of protection against flood damage and losses to industrial, commercial, residential, agricultural, and public property. Intangible benefits include increased safety, welfare, social stability, and economic stability to the residents and employees of the area.

4.0282 With this project, development in West Des Moines-Des Moines can be expected to, at the least, continue at its present rate. Without the project, development will probably slow considerably. This slowing will be the result of the restrictions in the Flood Disaster Protection Act of 1973 and various Iowa regulations on development of areas subject to inundation by 100-year frequency flooding. Under provisions of the Flood Disaster Protection Act, which went into effect 1 July 1975, land-use controls will be required in areas subject to inundation by the 100-year flood to purchase flood insurance. New structures under such controls will be required to be floodproofed to the 100-year level. If communities or individuals choose not be take advantage of the program, Federal grants or financing from Federally supervised lending institutions will not be available for public or private improvements.

4.0283 Relocation of one business and seven homes will be required for construction of the project. These relocation items will not have a significant impact on the economy of the area. The relocation will undoubtably cause certain hardships to the individuals directly affected. However, the benefits of the project to the overall community are considered significant and should offset the adverse impacts.

4.029 Recreation.

4.0291 Des Moines has developed bicycle trails beginning at Greenwood and Ashworth Park and continuing along the Walnut Creek and Raccoon River corridor. The city plans to expand this system to form a regional network of bicycle trails to serve users from West Des Moines, Windsor Heights, and Clive. Recreation demand for this popular outdoor activity is increasing within the region and the development of the proposed flood protection project will serve as a vital link in this regional network.

4.0292 The proposed trail will begin with a ramp at a proposed boat launch entrance road at 63rd Street near Station 106+50, as shown on Plate E-27. The adjacent parking lot can serve as a gathering area for cyclists who ride as a group or to store cars while using the trails in the region for touring type trips. A ramp will begin the paved trail to be constructed atop the levee and continue in a northerly direction. Cyclists will use the signaled railroad grade crossing at 63rd Street to cross the railroad tracks and travel east on Railroad Avenue to a ramp at a closure structure at Station 120+00. Scenic views in this reach are afforded by the Raccoon River and surrounding lowland forests.

4.0293 At Station 176+00 a ramp will be located to intersect with the trail leading from North Valley Drive. At Vine Street a ramp will lead to the trail extending to Legion Park in West Des Moines. The trail will continue atop the levee to a ramp at the 63rd Street crossings, Station 204+00, and then continue along the east edge of the roadway across Grand Avenue at grade and parallel Walnut Creek through the parkway. The trail will intersect at a bridge proposed by others crossing Walnut Creek traveling northeast and linking to urban paths and bike routes. At 63rd Street, the proposed trail will pass under the roadway as it enters West Des Moines.

4.0294 The north end of the project located in West Des Moines will provide a link for regional trail plans as discussed earlier. Continuing from the 63rd Street bridge, the trail would ramp to the levee and proceed northwest to near the end of the project along Hoak Drive and ramp down to existing ground elevation. The trail would be constructed to the same standards as the portion of the trail proposed in Des Moines.

4.0295 A boat ramp, parking lot, and fishing access area is proposed to be located adjacent to the Raccoon River, east of 63rd Street, as shown on the inclosed Plate E-27. The access road and parking lot will be gravel surface and the boat ramp will be concrete. The site will receive use by fishermen using the banks and sand flats bordering the river. Bottomland trees will be planted to shade users and beautify the development.

4.0296 A city park at approximately Station 90+00 in West Des Moines would be developed in conjunction with construction of the levee, ponding area, and stormwater pumping station. Existing private properties will be purchased by the city and be developed as a public park. The park will be designed and developed as a low density open space park. An access road, parking lot, and outdoor furniture will be located in the park. Landscaping and grading will create a natural setting for leisure pastime. Vehicle and bike access will be from the east end parallelling the railrod tracks. A walkway, steps, or ramp will be constructed as access to the adjacent gravel pits for fisherman's use.

4.0297 With the proposed availability of a 200-acre pit lake, the Raccoon River levee segment contiguous to the lake site becomes a potential key element in the ultimate outdoor recreational plan for this area. However, the pit lakes will not be available for another 15 years because of the ongoing sand and gravel operations by the Martin-Marietta Corporation, therefore no specific development plans have been made. It is expected that Martin-Marietta Corporation, the city of West Des Moines, and the Iowa Conservation Commission will coordinate their interests with regard to future development of this area.

4.0298 The ponding areas could function as dry weather recreational sites. Natural drainage or pumping will quickly dry them out following their use for storm water storage. City planners will determine outdoor recreational uses for these areas which will be compatible with their primary function of storm water storage.

4.0210 Historical and Archaeological.

4.02101 Based on the survey conducted by Environmental Research Company, there are no known archaeological, historical, or architectural sites that will be adversely affected by the project including the ponding and borrow areas. Coordination will be maintained with the State Historic Preservation Officer in the event that additional sites may be discovered during the actual construction period.

4.02102 Ten architectural sites included or recommended for inclusion in the Iowa Inventory of Historic Places will be protected from flooding by the planned levee. These sites are all in West Des Moines and are centered about two blocks north of Railroad Avenue on or near 5th Street.

4.02103 The only historic site in the project vicinity is the Jordan House, located on the north side of Fuller Road near South 19th Street. This site is listed on the National Register of Historic Places. The site will not be affected by the project nor will it be protected from flooding.

4.03 Indirect Environmental Impacts

4.031 With the assurance of flood protection, increased urbanization and development of the flood plain can be anticipated. Benefits attributed to such development would include possible increased employment, increased tax base, and enhancement of the area and regional economy.

4.032 Expanded recreational facilities are expected to include permanent type developments such as swimming pools, tennis courts, park and picnic areas, and similar facilities no longer postponed for fear of floods.

4.033 Increased development would also involve additional losses of existing vegetation and habitat, and open space. Increased levels of noise, water, and air pollution, as well as increased demands for various urban services can be expected.

4.034 With or without the proposed project, a flood plain management program should be implemented by the local governments to prevent further encroachment upon the flood plain. Such a program should allow only the development that is compatible with floodways and flood plain lands.

V ANY PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

5.01 General. The project will create direct environmental impacts, some of which cannot be avoided. Generally, these will be related to project construction activities. Indirect effects will come about largely in the post-construction period of the project, as a result of changing land use in the protected area.

5.02 Ecological Effects.

5.021 Levee construction or rehabilitation will result in total or near-total destruction of all vegetation within the boundaries of the levee. Approximately 22 acres of wooded area lies in the path of the proposed levee alignment. Most of this parallels Walnut Creek, along the existing levee which will be reconstructed. Vegetation along most of the remaining portion of the proposed alignment or within the boundaries of the proposed ponding areas is composed almost exclusively of herbaceous plants, largely annual weeds or grasses. Near-total destruction of the 22 acres of woodland will be unavoidable. Birds, mammals, and other animal life dependent upon the woody cover will also be lost. Songbirds will be most affected, at least in terms of numbers. Landscaping and revegetation associated with the proposed project will only partially mitigate losses to existing habitat and wildlife.

5.022 Approximately 4,000 feet of levee (from North Valley Drive to Grand Avenue) closely parallels Walnut Creek. This is a heavily wooded sector which shades the stream, helps cool the water and provides insect food supplies for Walnut Creek fishes. Elimination of a portion of this woody cover will have a minor adverse effect upon the quality of the Walnut Creek fishery, especially during low water stages.

5.03 The proposed project will have unavoidable adverse effects on area aesthetic and existing recreational developments along the immediate levee alignments. Project landscaping and revegetation will help offset the impairment to area aesthetics. The recreational development associated with the project will mitigate any adverse effects and will actually enhance the overall recreational program in the immediate area.

5.04 No known adverse effects involving historical, archaeological, or architectural resources are expected.

5.05 The adverse impacts associated with the relocation of one business and seven homes required for project construction are unavoidable under the present project alignment.

VI ALTERNATIVES TO THE PROPOSED ACTION

6.01 General. Discussed below are various structural and nonstructural alternatives that were considered as part of the project study.

6.02 No Additional Action. This alternative does not solve any of the area's problems or needs with regards to flood reduction and would maintain the status quo. The only losses to vegetation, habitat, and wildlife populations would be those losses associated with natural flooding conditions.

6.021 Provisions of the Flood Disaster Protection Act of 1973 and Iowa laws may result in a slowed rate of development within the flood plain if no project is constructed. Provisions of the Act would serve to protect open space, natural areas, and agricultural land.

6.022 The costs of this alternative are the continued threat of flood damage to existing buildings and crops, and related social stresses. Average annual flood damages have been estimated at $803,300.

6.023 This alternative would result in continued disruption of social and cultural features of the area, but would serve to prolong the life of the natural features.

6.03 Evacuation. Flood plain evacuation was considered but not extensively because the cost to evacuate the 925 residences, 150 commercial firms, and 25 industries would be excessive. Disrupting the affected families would also cause adverse social stress. The potential also exists for additional environmental damage depending upon the area and resources affected where relocation of existing development would occur.

6.04 Flood Proofing. Flood proofing which involves either raising structures above flood levels or protecting them by constructing walls around them, sealing the doors and windows, or some similar measures, was also evaluated. This alternative was also infeasible because of the number of structures, the depths of the water during flooding, the costs involved, and access limitations that would result.

6.05 Reservoir. Reservoirs were considered upstream of the study area on the Raccoon River and Walnut Creek. Both reservoirs were found to be economically infeasible. Reservoirs could not adequately reduce flood heights in the project area. The alternative would require additional flood reduction measures, such as levees, in the study area. Therefore, upstream reservoirs were not considered further as a solution to the flood problem for the study area.

6.06 Levees and Floodwalls. Levees and floodwalls were considered for three areas, as shown on Plate E-18. Levee alignments were considered to protect existing development and because of the high cost, floodwalls were considered only where existing development would preclude a levee. Alignment 1 and 1-A comprise the selected plan.

6.061 Alignment 1-B. This alignment and all those discussed below with the exception of channel modification are minor departures from the total alignment chosen as the selected plan. Alignment 1-B would have placed the line of protection on the east side of 63rd Street. No additional development would be protected and the proximity to Walnut Creek would cause rises in the 100-year flood exceeding one foot. In addition the cost of one additional closure structure and channel modification necessary to accommodate a reach of floodwall make this alignment significantly more costly than the alignment on the west side of 63rd Street which is the selected plan. This alignment would result in limited additional losses to existing flood plain vegetation and habitat.

6.062 Alignment 1-C considered raising a portion of Hoak Drive 9-10 feet and including it as part of the line of protection which would be extended to the I-235 embankment. Two additional developments along Center Street would be protected. The additional cost of this alignment is greater than the flood damage reduction benefits received and access to three businesses would be seriously impeded. The impact of Alignment 1-C on natural resources would be similar to those of the selected plan.

6.063 Alignment 1-D examined the feasibility of providing protection to a cement plant located south of Center Street. The close proximity of the plant to Hoak Drive and Center Street and the access requirements of truck traffic make the cost of floodwall and several closure structures greater than the benefits received. No significant environmental impacts would be expected since the area is heavily developed.

6.064 Alignment 1-E. This alignment would extend protection to three businesses on the east side of Hoak Drive and to an industry and business located along Center Street. Encroachment into the floodway by this alignment would increase 100-year flood heights in a residential area on the opposite bank by more than 2.0 feet making mitigative measures necessary for that area.

Protection to the residential area could be accomplished by construction of a levee there or by channelization of a short reach of Walnut Creek to increase capacity and velocity. Neither mitigative levee construction or channelization required to accompany this alternative would be economically feasible. The benefit-cost ratio of Alignment 1-E and levee construction on the opposite bank is 0.8:1. The benefit-cost ratio of 1-E and channelization is 0.4:1. In addition, both mitigative measures would destroy lowland woods and disrupt aesthetics of the stream. Channelization would also result in both short-term and long-term adverse impacts upon the aquatic environment within the Walnut Creek reach.

6.065 Alignment 2. This alignment would increase the protected area to include seven additional businesses and four residences by contruction of levees along the left bank of Walnut Creek in the vicinity of Grand Avenue. Cost of this plan is $910,000 excluding rights-of-way. Damage reduction benefits are $26,400 resulting in an unacceptable benefit-cost ratio of 0.5:1. In addition, this alignment would destroy lowland woods and could increase flood heights in this reach of Walnut Creek.

6.066 Alignment 3. This alignment would expand the protected area by construction of levees along the right bank of Jordan Creek and the left bank of the Raccoon River. Industries located in an industrial park would receive flood protection. Cost of this alignment is $500,000 excluding rights-of-way and drainage facilities. Benefits are $500 and the resulting benefit-cost ratio only 0.02:1. Environmental effects of this alignment would be an additional loss of lowland woods, wildlife habitat, and agricultural land.

6.07 Channel Modification. Channel modification of Jordan Creek, Walnut Creek, and the Raccoon River was studied to determine if the cost of such work would provide savings by reducing the required height of the levees. The studies revealed that channel modification would not provide such savings. In addition, dredging and straightening of these streams would cause extensive disruption of aquatic habitat and riverine environments particularly in Denman's Woods and Brown's Woods and damage the aesthetics of these natural areas. In addition, channel modification could reduce ground water recharge rates adversely effecting the Des Moines water supply.

VII THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

7.01 If the project is implemented, it is reasonable to assume that proposed use of the resources will be of a long-term nature. The project is designed to provide protection, for the urban area of West Des Moines and Des Moines, against the Standard Project Flood.

7.02 The design and objective of the proposed project alludes to the sole purpose of health and safety for man. Aside from direct protection for life and property, the project will reduce both direct and indirect social stress associated with flooding. The project will also provide for the enhancement of recreation and open space opportunities for use by the general public.

7.03 The impairment of recognized biological and aesthetic resource values within the project area must be weighed against long-term productivity of all potentially affected lands, especially in the context of no flood control project. Emigration from those portions of the project area particularly prone to flooding is a possibility, without the project. This could lead to development, perhaps in areas not well suited for such development. Severe damage to the ecology of outlying natural areas could result, which in the long-term could be more damaging in total impact.

7.04 Projected community growth has already pointed up the need for expanded outdoor recreational facilities, particularly in West Des Moines. The recreational development and opportunities associated with the project will contribute to the maintenance and enhancement of long-term productivity in the general area of outdoor recreation. The landscaping and revegetation featured as part of the proposed project will partially restore woodland balance to the project area.

7.05 The project may restrict, but does not foreclose, future options for use of the floodway of Walnut Creek, Jordan Creek, or the Raccoon River. Recreational and open space aspects of the respective floodways can be fully exploited while flood hazards exist. If future generations opt to expand into the floodway, the project is not an insurmountable obstacle.

VIII ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

8.01 General. In consideration of irreversible or irretrievable commitment of resources, value judgment must be given to social values, basic economics, and technological change. As with most actions by man, both direct and indirect commitments are made that may be irreversible or irretrievable. Such actions include commitments of defined natural resources, i.e., mineral, vegetation, water, etc., and cultural-social resources, such as, space, energy, manpower, time, and money. In an analysis of either set of commitments no finite quantitative expression can be given, especially in respect to cultural-social resources.

8.02 Natural Resources

8.021 The levee will be constructed of earthen material, silt and clays, which although committed could be reclaimed for other uses. The mineral components--concrete, sand, and gravel--found in various structures of the project are essentially irretrievable although secondary uses could be made of these materials.

8.022 The removal of 22 acres of mature trees, brush, and existing grassland for the structures can essentially be considered as a loss of these resources. While the loss of mature trees and shrubs may be irretrievable the effects on grassland is not. Seeding and landscaping of the project structures will replace or retrieve a degree of the lost grasslands, and such action should provide a higher quality of grassland habitat.

8.023 The loss of existing ecosystems along the levee alignment is essentially irreversible, but the establishment of new ecosystems is a reality. The relative quality of these new ecosystems as equated to man's environment must be reflected in his needs at a given point in time.

8.024 There is no irreversible or irretrievable loss of water or air quality as a result of this project. Conversely, the restraint of development in the floodway should tend to enhance water quality of the respective streams.

8.03 Cultural-Social Resources

8.031 The expenditure of fuel, manpower, and time during construction, for all practical purposes, is an irreversible and irretrievable commitment. Likewise, the time and energy expended for maintenance and operation of the project are resources fully expended. The terrestrial space occupied by the project while currently committed is not irretrievable in the true sense. Under a free enterprise system, the space committed could be retrieved in the future.

8.032 As cited in the archaeological survey, there are no known sites in the project area. Therefore, construction and/or operation and maintenance of the project should not foreclose or cause an irrevocable use of this cultural resource.

IX COORDINATION AND COMMENT AND RESPONSE

9.01 Public Participation.

9.011 The public involvement program has been a continuous effort since the study began. From 1959 to 1971 the program was very active. Recently, it has diminished to close coordination with representatives of local entities involved.

9.012 In 1959, five public hearings were held in the basin to ascertain from local people their feelings on the nature and extent of flood damages and the frequency of flood occurrences. Suggestions for flood control measures were also requested.

9.013 In 1970, three public meetings were held to describe the proposed plans for the basin study and to obtain views regarding each proposal.

9.014 A public meeting was held on 6 May 1975 to discuss the West Des Moines-Des Moines Local Protection Project and to obtain views and comments on the proposed project and draft EIS. The official transcript of the public meeting may be reviewed in the Rock Island District office.

9.02 Government Agencies.

9.021 Several meetings were held in May 1970 at selected locations to inform local officials of preliminary plans and proposals. Area residents also attended these meetings.

9.022 Much of the coordination with interested Federal and State agencies consisted of written correspondence between the Corps of Engineers and those agencies. Letters of coordination with the various Federal, State, and local agencies may be reviewed at the U. S. Army Engineer District, Clock Tower Building, Rock Island, Illinois. On 25 March 1975, the draft environmental statement was circulated to Federal, state, and local governmental agencies asking for their review and comment. Their comments are stated below and copies of their letters are included in the Final Environmental Statement.

9.023 Environmental Protection Agency

Comment: The principle source of drinking water for the city of Des Moines is the infiltration galleries which run parallel to the Raccoon River. The statement should show the location of these galleries on the project maps. An evaluation of the potential infiltration of pollutants from the ponding areas adjacent to the Raccoon River should be included in the final statement. This would permit an assessment of possible health risks from pollutants introduced into the public water supply. The draft statement indicates that project induced urban and industrial development will occur within the protected area of the levee project. An assessment should be provided which discusses the possible influence this induced development may have on the water quality of the Raccoon River and the Des Moines public water supply.

Response: Past experience has indicated that future development within the area of protection can be expected. However, it is impossible to predict the exact type and extent of industrial and residential development that will occur. Mr. Maurice King, Manager of the Des Moines Water Works, feels that the project would not have any effect on the infiltration galleries and the city water supply. The galleries are located outside of the project limits on the south side of the Raccoon River from Fluer Drive to just beyond the mouth of Walnut Creek.

Comment: If the Administrator of EPA, upon review of the final project design, determines that a possible contaminant introduction to the recharge zone surrounding these galleries could result in a significant hazard to public health, he will publish this determination and no commitment for federal financial assistance may be entered into for this project until a new plan or design alleviates the hazard (Safe Drinking Water Act, PL 93-523).

Response: No response necessary.

Comment: The final statement should provide information on anticipated water quality of the proposed storm water ponding areas. An evaluation of the potential health risks associated with ponding storm water near residential developments should be specifically included for ponding areas one and four.

Response: Data on anticipated water quality of storm water ponding areas is not available at this time. The public health and safety of the project area will be improved as compared to without project conditions. The ponded water will be confined to areas specifically designed for that purpose as opposed to widespread river flooding. The expected duration of ponding will be several hours for gravity conditions and up to two or three days along Walnut Creek and up to one week along the Raccoon River for blocked gravity conditions. Pumping plants will allow evacuation of ponded water for ponds 1 and 3 during blocked gravity, so the duration of ponding will be limited to several hours during blocked gravity.

The health and safety risks associated with depths of ponding will be offset by fencing of the ponding areas.

Upon project completion the cities of Des Moines and West Des Moines will assume the responsibility to operate and maintain the ponding areas in a manner that is compatible with adjacent land use.

Comment: The location of the 44-acre tract of land for proposed borrow material extraction is adjacent to the headwaters of Jordan Creek. An assessment of potential construction impacts to Jordan Creek from the extraction operation should be provided. This should include information on potential adverse effects on the aquatic environ of Jordan Creek from erosion, siltation and equipment maintenance (fuel and oil spillage). Measures to control these potential impacts to Jordan Creek should also be identified.

Response: The proposed borrow area, shown on Plate E-17, will be located about 600 feet from Jordan Creek. The construction plans and specifications will specify measures to be used by the contractor to control adverse effects of borrow extraction.

Comment: The report should provide an assessment of ponding areas with respect to their adequacy in providing protection for future West Des Moines development. With additional development, urban runoff will increase and this, in turn, may necessitate future interior drainage requirements such as ponding areas, ditches and pump stations. The final statement should address the possibility that following project completion and future urban development adjacent to the ponding areas, these ponding areas may no longer serve their designed function.

Response: The urban hydrologic analysis for the interior drainage study included appropriate factors to reflect anticipated future urban development. For the feasibility scope study, ponding areas were sized to handle surface runoff for the one-year storm for blocked gravity conditions or the 50-year storm for gravity conditions whichever is greater. In most cases, gravity conditions prevail meaning the ponding areas are large enough to store much more than the one-year event for blocked gravity conditions. Gravity outlets are generally sized assuming all surface runoff can reach these outlets freely with no obstructions, which in most instances is not the case because of under sized culverts through streets and railroad embankments and under sized storm sewers. Therefore, under existing conditions, these outlet structures and ponding areas are oversized and reflect potential for future drainage improvements.

Following authorization of the project by Congress, the advanced engineering phase of the study will reflect a more detailed storm drainage study.

Comment: It appears that additional levee material could be extracted from the proposed ponding areas three and one, thus reducing the agricultural land consumption for borrow material. The final statement should discuss the possible reduction in farm acreage loss by utilizing these other sites.

Response: Maximum available amounts of borrow is assumed from all ponding areas. Some fill material from Area 1 will be used to improve an embankment around the ponding area. Land use near Area 3 will not allow additional fill to be taken.

Comment: It is indicated that a minor increase in the flood profile and velocity will occur in the Walnut Creek and Jordon Creek areas. Information on water surface profiles with the proposed improvements should be presented. The change in the degree of flood protection for Des Moines, resulting from increased flood stages due to this project, should be evaluated in the final statement.

Response: Additional data has been provided in the EIS. No new areas should be subject to flooding as a result of the proposed project. As noted in the EIS any anticipated changes in profile must be within applicable state standards.

9.024 U. S. Department of the Interior

9.0241 Bureau of Mines

Comment: Sand and gravel has been mined along the southwestern end of the project area, and three gravel pit lakes occupy about 90 acres. The statement neither mentions these sites nor explains whether sand and gravel is currently being produced near the area. We suggest that the final statement discuss this matter as well as the effect of the project on future production. The deeply buried coal in the area is of little value.

Response: The above information has been further clarified in the revised draft EIS.

Comment: Because the entire project is within the city limits, we believe that construction should not significantly alter the availability of mineral resources in the area.

Reponse: No response necessary

9.0242 Bureau of Outdoor Recreation

Comment: The statement covers outdoor recreation and related environmental matters as it relates to this project in a satisfactory manner. However, it would be desirable if the environmental statement was expanded to show the interrelationship of this project to the riverfront recreational development plan being considered by the city of Des Moines.

Response: Coordination with local interests is continuing in developing a compatible recreation plan.

9.0243 Fish and Wildlife Service

Comment: In general, the potential fish and wildlife losses are adequately described. However, these losses and the cost of replacing them should be identified as project costs and distributed among appropriate project functions. Specific measures to compensate for wildlife losses should be outlined in the environmental statement.

Response: Fish and wildlife losses are discussed in the EIS and such losses are considered intangible. To the best of our knowledge no Federal or state agency has been willing to place a monetary value on fish and wildlife species or associated habitats. As noted in the EIS, the landscaping and revegetation plan should partially offset losses to existing habitat. The levee may also act as a physical and psychological barrier preventing further encroachment by man upon existing resources along the streams.

Comment: The information presented on rare and endangered species is not complete. The exact status of each species in the project area should be established and presented in the final environmental statement.

Response: The status of rare and endangered species as can best be determined is addressed in the EIS.

Comment: Wildlife values were apparently not fully considered in the study of alternate alignments. Wildlife aspects of all alternates should be discussed. Alternate alignment 1-C, which proposed raising a portion of Hoak Drive as a part of the line of protection, would be less detrimental to wildlife habitat. Also, the encroachment into the northwest portion of Denman Woods and the wooded area east of North Valley Drive could be avoided by a minor change in alignment. We strongly recommend that these changes in alignment be incorporated into the selected plan in order to lessen the impact of the project on wildlife resources.

Response: Project alternatives will be more fully evaluated during the detailed planning stage. Coordination with Federal, state and local agencies will be maintained during these studies.

Comment: Zoning designed to restrict further industrial and residential encroachment into the floodplain should be a prerequisite to any flood protection plan. In many cases such development destroys more wildlife habitat than construction of the project. We realize that zoning is the responsibility of local authorities, but we maintain that it could be included as a project requirement in the negotiated agreement between the Federal Government and local sponsors. In our opinion, realizing project benefits for the protection of future developments in the floodplain performs quite the opposite function and condones poor floodplain management at the expense of natural environmental values.

Response: As stated in the EIS a flood plain management program is recommended with or without the proposed project. However, the Corps of Engineers does not have the authority to require local governmental bodies to regulate or restrict future development or expansion of existing development within the flood plain.

Comment: Portions of the existing levee have vegetative cover valuable to wildlife. We recommend repair work be restricted to areas where it is most needed instead of general reconstruction of the entire levee. Plans for this repair work should be discussed

Response: The proposed project will provide protection to the Standard Project Flood level. The entire existing reach of levee will have to be upgraded to this level of protection otherwise it will be the weak link in the system.

Comment: The exact status of the showy orchis in the project area should be established. A slight adjustment in the proposed alignment would allow the project to avoid encroachment upon Denman Woods and would ensure that none of these plants would be disturbed.

Response: As pointed out in the EIS the showy orchis was not found along the immediate project alignment. Adjustment of the proposed alignment within the Denman Woods area will be studied in more detail during the Phase I studies.

Comment: We recommend that native plant species be considered for the seeding and planting program. These species would provide more requirements of resident wildlife than exotic plant species. Wildlife values should also be considered when choosing seed mixtures for erosion control seeding. We realize native prairie species do not establish quickly enough to provide early erosion control needs. However, they are extremely competitive once they become established, and we recommend their use in selected areas with low erosion potential. The variety of species in this groups provides many forms and colors, supplies plant diversity valueable to wildlife, and diminishes the need for maintenance since neither mowing or blanket spraying is needed for weed control.

Response: Native plant species will be used in the seeding program wherever possible.

Comment: The integrity of the areas near the streams should be protected by minimizing the number of access roads beyond the levee, restriction of motorized recreational vehicles (e.g. motorcycles, snowmobiles, and all terrain vehicles) to access roads only, and emphasis of natural environmental values in areas designated for future park development. The recreational plan should also include measures to restrict motorized vehicles from footpaths or bicycle paths along the levee crown. Although these vehicles are highly used by the public for recreational purposes, their use is often incompatible with the ecology of natural or wildlife areas. The existing levee shows evidence of high use by these vehicles, and we recommend a safeguard restricting such use on both the old and new levee be written into the project agreement.

Response: The above recommendations will be given consideration in developing the recreation plan. Development of trails for recreational vehicles has been requested by other governmental entities and private organizations. The extent of trail development will be highly dependent upon the local sponsors who are responsible for operation and maintenance and enforcement associated with such development.

9.0244 National Park Service

Comment: We are pleased to note the careful review that has been made of historic and archaeological sites in this document. This review appears to be in substantial compliance with the procedures for the protection of historic and cultural properties established by the Advisory Council on Historic Preservation and published in 36 CFR Part 800 and also in Federal Registers on January 25, 1974 (copy enclosed) and February 4, 1975.

Response: No response necessary.

Comment: No evidence of consultation with the State Historic Preservation Officer for Iowa, Mr. Adrian Anderson, B-13 MacLean Hall, Iowa City, Iowa 52242, has been presented, although it is stated that coordination will be maintained with the State Historic Preservation Officer in the event that additional sites may be discovered during the actual construction period. The possibility that eligible Register sites are present which would be affected (beneficially or adversely) by the project should be explored in consultation with the SHPO and the determination of no effect on the Jordan House should also reflect that it was made in consultation with Mr. Anderson.

Response: Consultation with Mr. Anderson has been initiated and his comments are incorporated in the revised draft EIS.

9.0245 Geological Survey

Comment: One of the alternative levee alignments considered in Section VI has been rejected because it would increase the 100-year flood stages in the residential area on the opposite bank by 2.5 feet, requiring that a levee be constructed around that residential area. However, no estimate has been noted in the draft EIS of the impact of the proposed levee on flood levels on the opposite bank. Since levees are proposed only on one side of Walnut Creek, and no existing levees are on the opposite bank, it would be advisable to provide an evaluation of this possible impact.

Response: Discussion of Alternative 1-E (paragraph 6.064, Section VI) has been expanded in the revised draft EIS to include quantitative and qualitative assessment of the impacts of that alternative.

Comment: It is suggested that the 70 acres of flood plain to be occupied by four ponding areas for interior drainage be mentioned specifically in the Summary of the EIS.

Response: The Summary of this revised draft EIS has been modified to include mention of the ponding areas.

Comment: The reference to Section VI on page 15 (paragraph 5.02) should be changed to Section IV.

Response: The reference in the above comment has been revised and corrected in the revised draft EIS.

Comment: In the Glossary definition of Pleistocene, "this is the present geologic time period . . . ." should be changed to "this is the earlier of the two epochs comprising the Quaternary geologic time period . . . ."

Response: The purpose of the Glossary is to define technical terms, when possible, in a more simple language for easier understanding by the reader. The suggested change does not accomplish this goal but in fact gives a technical definition to a technical term. No revisions were in the revised draft EIS concerning the above comment.

9.025 U. S. Department of Agriculture

9.0251 Forest Service

Comment: The Corps has provided for adequate preservation of woodland compatible with the purposes of the project. To enhance natural resources as well as preserve them, the final statement should include plans for establishing wildlife cover where practical.

Response: The above has been considered in development of the proposed project.

9.0252 Soil Conservation Service

Comment: No comments at this time.

9.026 Advisory Council on Historic Preservation

Comment: The Advisory Council has determined that the draft environmental statement appears procedurally adequate. To ensure a comprehensive review of historical, cultural, archaeological, and architectural resources, the Council suggests that the final environmental statement contain evidence of contact with the Iowa State Historic Preservation Officer and that a copy of his comment be included.

Response: Consultation with the State Historic Preservation Officer has been initiated. His comments are included and addressed in the revised draft EIS.

9.027 U. S. Department of Health, Education, and Welfare

Comment: There is no apparent impact on programs of the Department of Health, Education, and Welfare. It appears that the impacts of the proposed action and the reasonable alternatives have been adequately addressed.

Response: No response necessary.

9.028 U. S. Department of Transportation

Comment: The draft EIS indicates material for the levee construction will be obtained from a borrow area located 2.5 miles from the project. The location of this borrow area and haul routes needed to transport the material to the project should be identified. The following impacts along the haul routes and resulting from the material hauling process should be discussed in the Final Statement.

1. Additional roadway or bridge maintenance costs.
2. Safety measures during hauling operations.
3. Impacts on noise and air quality.

Response: Location of the proposed borrow area has been shown in the revised draft EIS. Impacts associated with the hauling process from the borrow area will be evaluated during detailed engineering and design studies. Construction of the proposed project is still several years away. Local road networks, borrow areas location, and Federal, State, and local noise and air quality standards could change within that period of time.

9.029 U. S. Department of Housing and Urban Development

Comment: HUD programs for the area in which the project

Office. By copy of this letter, Mr. Birch is requested to review the draft statement and report his comments directly to you within 45 days as indicated in your request.

Response: No comments have been received from the Omaha Area Office.

9.0210 Iowa State Clearinghouse

The Office of Planning and Programming which serves as the Iowa State Clearinghouse transmitted comments from the Iowa State Highway Commission. Other state agencies submitted comments under separate cover.

9.02101 Iowa State Highway Commission

Comment: The project does not appear to conflict with any highway improvements presently programmed by the Iowa State Highway Commission.

Response: No response necessary

9.02102 Iowa Conservation Commission

Comment: Certain alignment changes within the levee system would avoid encroachment upon Denman Woods.

Response: See response to similar comment by Department of the Interior, Fish and Wildlife Service.

Comment: Present recreational opportunities that are listed does not include snowmobiles. A properly designed and managed multi-purpose trail that includes snowmobiles would provide a link to larger areas outside of the metropolitan area for a large urban population.

Response: See response to similar comment by Department of the Interior, Fish and Wildlife Service.

Comment: The planting and seeding programs for the construction areas including the ponding areas would best be served by native plant species.

Response: See response to similar comment by Department of the Interior, Fish and Wildlife Service.

Comment: The recommendations for a river access in the vicinity of the 63rd Street bridge is very valid and is a needed

Response: No response necessary

Comment: The feasibility of extending the levee system around the Martin Marietta sand and gravel operation should be investigated for protection of the future recreation area.

Response: The feasibility of the above recommendation will be investigated further during detailed engineering and design studies. However, coordination with the Iowa Conservation Commission has indicated that no recreational development plans for the Martin-Marietta area have been initiated at this time.

9.02103 Iowa Natural Resources Council

The following are comments provided by the Iowa Natural Resources Council at the public meeting on 6 May 1975.

Comment: The recommended project as proposed does provide a relatively high degree of flood protection for the cities of Des Moines and West Des Moines. The level of protection provided by the project meets the criteria of the Resources Council relating to levees and flood walls constructed for flood control. The alignment of the recommended levee and floodwall is consistent with the criteria of the Resources Council relating to flood plain encroachment.

Response: No response necessary.

Comment: The recommended project represents an economical alternative available for reducing flood damages in the cities of Des Moines and West Des Moines consistent with the constraints of the authorization which permits the Corps of Engineers to participate in the project development.

Response: No response necessary.

Comment: The Iowa Natural Resources Council believes there is a need for implementation of a structural program and non-structural alternatives for managing the flood damages of the Raccoon River and Walnut Creek in the cities of Des Moines and West Des Moines and urges the Corps of Engineers to proceed with the completion of the report and submit it to their higher authority for appropriate action consistent with the desires of the affected communities.

Response: No response necessary

9.0211 State Historic Preservation Officer

Comment: As a result of our investigations it has been determined that this project will have no apparent affect upon houses either on or eligible for inclusion on the National Register of Historic Places. It is my understanding that field surveys have not identified archaeological resources in the project area, nor have such archaeological resources been identified in designated borrow areas. If different, unsurveyed borrow areas are designated, however, they should be investigated prior to use.

Response: Any changes in the proposed plan or possible discoveries made during actual construction will be coordinated with the State Historic Preservation Officer.

9.0212 City of West Des Moines

Comment: The selected plan of improvements appears to be in accord with benefits desired and the City Council of the City of West Des Moines agrees to this communities share of local participation and responsibility. We urge immediate consideration and congressional approval for early implementation.

Response: No response necessary.

9.0213 City of Des Moines

Comment: The City Council has determined that it is a good project and should be advanced with all haste.

Response: No response necessary.

9.0214 Des Moines Water Works

Comment: It appears that construction would occur on land owned by the Board of Water Works Trustees. The Board owns all of the land on both sides of Walnut Creek and Raccoon River in Sections 12 and 13, T78N, R25W. It would be helpful if you could furnish to us the proposed construction plans in this area so that we may review them for possible effect on our installations.

Response: Further coordination will be accomplished with the Water Works during the detailed planning phase when specific construction plans are developed.

9.0215 The following governmental agencies received copies of the draft EIS. However, no comments were provided.

U.S. Department of Commerce
Federal Energy Administration
Water Resources Council
Upper Mississippi River Basin Commission
Central Iowa Regional Association of Local Governments
Polk County Planning Director
Polk County Conservation Board
Polk County Board of Supervisors
Iowa Water Resources Congress
Des Moines Department of Public Works
Des Moines Park Director
Des Moines Director of Planning and Zoning
West Des Moines Department of Public Works
West Des Moines Park Director
West Des Moines Director of Planning and Zoning
Des Moines River-Front Commission

9.03 Citizen Groups.

9.031 Opposition to the proposed project has been expressed by W. H. Jamison and Company, Inc., The Pathfinder Company, Mr. Clark Colby, and Mr. William Brady on the basis that the proposed alignment excludes them from flood protection. The Wheeler Division, St. Regis Paper Company has also expressed opposition to the project although no specific reasons were indicated.

9.032 The following groups and individuals have provided either written comments or presented oral statements at the public meeting on 6 May 1975 regarding the proposed project.

9.0321 Chamber of Commerce of West Des Moines

Comment: The Board of Directors of the Chamber of Commerce of West Des Moines endorses the concept of the flood control measures as presented and urges that the proper bodies move forward with all haste to make adequate flood control preparations for the community.

Response: No response necessary.

9.0322 Martin Marietta Aggregates

Comment: It appears the levee is routed through our sand and gravel plant. We therefore request that the levee section which starts at Station 19+50 and is parallel to Jordan Creek be extended easterly to the edge of the plant area. The levee then will proceed northerly along the plant area, and tie back into the proposed levee alignment above Station 60+00.

Response: Specific alignment will not be determined until the detailed planning phase. Coordination will be continued with Martin Marietta to resolve any possible conflicts in the proposed alignment.

9.0323 Iowa State Snowmobile Association and Mid-Iowa Snowmobile Club Inc.

Similar comments were submitted by the above two groups and are combined and summarized below.

Comment: These groups would favor a multi-purpose trail system to be incorporated with the proposed project. Recreation is a vital part of todays society, and horseback riding, bicycling, hiking, cross-country skiing, and snowmobiling are all forms of recreation which are compatible on a multi-purpose trail system. The groups would be glad to work with the Corps of Engineers, the State Conservation Commission and any local Des Moines organizations in any way they can to develop a multi-purpose trail system to enhance a flood control project.

Response: See response to comment concerning recreation vehicles and trail development by Department of the Interior, Fish and Wildlife Service.

9.0324 Iowa Power

Comment: Areas where conflicts with existing Iowa Power gas mains and electric distribution and transmission facilities may occur have been indicated. Because of the lack of detailed information available at this time concerning specific construction details along the levee route, it is impossible to state where conflicts with our facilities will actually occur. However, the areas where the levee and our facilities are in close proximity should be considered as areas where relocation of gas and electric facilities may be required.

As detailed construction plans are developed, we will work with the Corps to determine the nature and extent of any required relocations of our gas and electric facilities. At this time it also will be possible to draw up any agreements necessary to accomplish these relocations.

Response: No response necessary

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9.0325 Chicago, Milwaukee, St. Paul and Pacific Railroad Company

Comment: The Milwaukee would be involved with a track raise and a closure structure both located along Walnut Creek. We see no serious problems with the proposed plans.

Response: No response necessary

9.0326 R. W. Messerschmidt

Comment: Mr. Messerschmidt made an oral statement at the public meeting indicating his support and favorable opinion of the proposed project as the President of the West Des Moines Development Corporation; Chairman of the Revitalization Task Force of the Downtown Area of West Des Moines; Member of the West Des Moines Chamber of Commerce; President of the First National Bank of West Des Moines, and a citizen of West Des Moines.

Response: No response necessary

9.0327 Hubert Frazier

Comment: (Oral Statement at Public Meeting) Mr. Frazier indicated that he feels many of the flooding problems resulted from filling of the original channel of Walnut Creek near Center Street for development purposes. He also feels that channel cleanout and debris removal would allievate much of the problem. He expressed his concern for saving property and homes from flooding and worry about wildlife later on.

Response: The EIS has been prepared for the purpose of addressing the most feasible plan for flood protection while evaluating all aspects of engineering, economic, social, and environmental considerations.

9.0328 John W. Patterson

Comment: (Oral statement at Public Meeting) Mr. Patterson is highly in favor of the project and strongly urges that the plan be formalized and adopted.

Response: No response necessary

9.0329 Ms. Vivian Haag

Comment: Ms. Haag indicated that she lived in the Janet's Woods area, east of Walnut Creek and was concerned about the effect of the proposed project on properties on the east side of the creek.

Response: Flood height effects were considered during the study and it is anticipated that the proposed project will not exceed state standards for increases in flood heights on the opposite bank. This raise is within the state standards administered by the Iowa Natural Resource Council.

9.03210 The following organizations or individuals have expressed opposition to the proposed project by either written statement or oral statement presented at the public meeting.

9.032101 Wheeler Division, St. Regis Paper Company

Comment: The Wheeler Division, St. Regis Paper Company wants to go on record as protesting the Walnut Creek flood control plan as outlined at the recent West Des Moines meeting.

Response: No response necessary

Comment: We certainly feel that there are more logical opportunities to control these flood waters and therefore wish to advise that we vigorously oppose this present plan.

Response: The above comment is impossible to evaluate because no indication is given as to what is wrong with the proposed project or what would consist of more logical opportunities to control flooding. Further coordination with the Wheeler Division will be accomplished in attempting to resolve the conflict.

9.032102 W. H. Jamison and Co., Inc.; The Pathfinder Company; Mr. Clark Colby, and Mr. William Brady

Comment: The above have expressed similar comments in opposition to the project. They do not oppose flood protection per se, however, they are opposed to the proposed project because it presently excludes them from flood protection. They all feel that there are more feasible alternatives which would include them in the flood protection plan.

Response: A meeting was held with the above to discuss their problems. It was explained that various alternatives were evaluated during the planning process and it appeared that they were not economically justified on an incremental basis. However, the Corps of Engineers indicated that they would review the alternatives again during the detailed planning stage.

9.033 The following organizations, citizens groups, and individuals received the draft EIS but no comments were provided.

- Des Moines Audubon Society
- Chicago, Rock Island and Pacific Railroad
- Chicago and Northwestern Railroad
- National Audubon Society
- Sierra Club
- Izaak Walton League of America
- League of Women Voters of Des Moines
- Glenn Construction Company
- Iowa Concrete Products Company
- Penn-Dixie Cement Corporation
- Johnnie's Vet's Club
- Apex Concrete Company
- Herberger Fabrics
- Hoak Construction Company
- Iowa Pool and Plumbing Supply Company
- Northwestern Bell Telephone Company
- Mr. William A. Boler
- Mr. Irving J. Caspe
- Mr. Jack A. Thorp

9.04 Revised Draft EIS - Departmental and State Review

9.041 In August 1976 the Revised Draft EIS and Feasibility Report were distributed by the Chief of Engineers for departmental and state review. Those agencies and individuals to whom the EIS and report were provided are listed below. Those from which comments concerning the Revised Draft EIS were received are indicated by an asterisk (*). The following section contains the Corps response to comments received. Copies of the letters of comment can be found in Appendix B.

- *US Environmental Protection Agency
- *US Department of the Interior
- *US Department of Agriculture
- *US Department of Transportation
- *US Department of Housing and Urban Development
- US Department of Health, Education, and Welfare
- Office of Management and Budget
- Senator Dick Clark
- Senator John C. Culver
- Representative Neal Smith
- *Governor of Iowa
- Iowa Natural Resources Council

9.042 US Environmental Protection Agency

Comment: We have reviewed the Revised Draft Environmental Statement and the project and statement have been rated LO-1. This rating means we have a lack of objections to the project as proposed and believe the statement provided an adequate appraisal of the proposed action.

The proposed project was reviewed by this agency and comments sent to your office on May 16, 1975. The additional information in the revised statement and your responses to our original comments provided sufficient data to alleviate our concerns with the project.

Response: Comment and project rating is noted.

9.043 US Department of the Interior

Comment: The approximate location of infiltration galleries for ground water collection should be shown on the maps or figures to indicate the relation to proposed structures or areas influenced by them. This would allow evaluation of the potential project impacts on the movement and quality of the ground-water resources. Existing or needed floodproofing for floodplain facilities related to the infiltration galleries should also be described. Sufficient information on the proposed pumping stations should be included to permit evaluation of the potential for impacts on ground water.

Response: Officials of the Des Moines water works facilities have indicated to the District that the proposed project will have no affect on the existing infilitration gallery system. The galleries are located along the south bank of the Raccoon River from near the mouth of Walnut Creek downstream to Fleur Drive. The relative short duration of the temporary ponding of storm water should have minimal effect on the ground water.

Comment: Contrary to the belief expressed in the Bureau of Mines May 16 memorandum, we now believe that the project may have a significant adverse impact on recovery of sand and gravel resources in the floodplain of the Raccoon River. A limited amount of sand and gravel would be lost under the proposed levees, and committed beneath proposed ponding areas if not recovered beforehand. We are more concerned, however, about the effect on active mineral operations and future recovery of available sand and gravel resources that remain in areas of adjacent to project structures. The final locations selected for levee construction should consider the probable impact on these resources because fragmentation of sand and gravel deposits would hamper, and perhaps preclude, recovery of significant amounts of the resource.

Sand and gravel deposits in the project area are important because of their size and proximity to markets in the metropolitan area. We believe that every effort should be made to recover all available sand and gravel resources in the project area before the land is dedicated to other uses which would preclude its recovery.

Any analysis of project impacts on sand and gravel resources should include a discussion of the magnitude of the resource affected, and an assessment of the overall effect on the availability of sand and gravel resources in the Des Moines area.

Response: The District will consider all impacts on sand and gravel deposits during post-authorization planning of the proposed project. The Martin-Marietta Company has suggested a levee alignment change which will be considered in post-authorization planning. The District realizes that changes will probably occur in this reach of the project between the time of the Feasibility Study and the detailed design stage. The main purpose of the Feasibility Study is to formulate the project concept. Since the District has general approval of a levee alignment through the sand and gravel deposit area from the property owner and local, state and Federal officials, the exact location of the levee which minimizes impacts on sand and gravel deposits can be determined during post-authorization planning and design.

Comment: We suggest that the effect of the project on sand and gravel resources and operations be described more precisely. For example, the sentence about mining in paragraph 2.032 should be recast to show that Polk County is the leading source of sand and gravel in Iowa and that a significant part of the production and available resources near the metropolitan area, are in the project area. The county is a leading cement-producing area in the State, and the Penn-Dixie Plant, which is adjacent to the project in West Des Moines, presumably would be among the beneficiaries of proposed improvements for flood control. Section IV, especially, should be expanded to describe all impacts of the proposed action on sand and gravel resources.

Response: See preceding response. The EIS has been modified to reflect that Polk County is the leading source of sand and gravel in the state.

Comment: Paragraph 4.021 should be clarified to indicate that some volume of borrow material will be removed from a 44-acre area.

Response: The Final EIS has been modified to reflect the approximate volume of material to be removed from the borrow area.

Comment: We believe that the glossary definition of Pleistocene is misleading and not in agreement with general usage. We recommend that the definition read "The time of most recent extensive glaciation, extending from about 1.5 - 2 million years ago-up-to-the beginning of present (Holocene) time."

Response: The above recommended change has been incorporated into the Final EIS.

9.044 US Department of Agriculture

Comment: On Page 73 of the project report it is noted that one business and seven homes will be relocated as a result of the proposed project. The environmental impact statement does not list this as an impact.

Response: The EIS has been revised to reflect the impact of the proposed relocations.

Comment: The plan notes that 44 acres of agricultural land and 22 acres of forest land will be affected by the project. While these acreages are quite small, their relationship as to total acreage and quality of agricultural and forest land should be noted. The environmental impact statement should note this relationship to properly assess the impact.

Response: It is felt that the existing setting and project impacts associated with the borrow area and forest land are adequately addressed in the EIS.

9.045 US Department of Transportation (Coast Guard)

Comment: The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. The Coast Guard commented as follows:

"Boater education and boating safety should have a place in the planning of recreational improvements in this project."

Response: The safety and welfare of the public are always prime considerations in the planning and design of recreational facilities associated with any project. Boater education and safety will continue to be a consideration during post-authorization studies. Coordination will also be maintained with the Coast Guard and the State Conservation Commission to insure the safety and welfare of the recreating public.

Comment: The Department of Transportation has no other comments to offer nor do we have any objections to this project. The final statement, however, should address the concerns of the Coast Guard.

Response: Comment noted.

9.046 US Department of Housing and Urban Development

Comment: I have reviewed the Draft Enviromental Statement for Flood Protection in the Des Moines River Basin, and have found the document to be satisfactory in meeting the spirit and intent of the National Environmental Policy Act of 1969.

This determination was made on the basis of the following considerations: (1) HUD's areas of review responsibility in accordance with NEPA, and (2) HUD's activities in the Des Moines area that might be affected by the Environmental Statement.

Response: Comment noted.

9.047 Iowa Office of the Governor

Comment: Based on response from the agencies and individuals to which the report and environmental statement were distributed and the evidence presented as a result of the October 5, 1976, public hearing, the following comments are submitted on behalf of the State of Iowa.

1. The function of providing flood protection to portions of the cities of Des Moines and West Des Moines is considered to be justifiable as a recognized hazard from flood does exist in the area proposed for protection.

Response: Comment noted.

Comment:

2. The project is responsive to water and related resource problems of flood prone areas of Des Moines and West Des Moines by providing a high degree of flood protection to existing

industrial, commercial and residential development and incorporates provisions for recreation into the project design.

Response: Comment noted.

Comment:

3. While the project as proposed is not incompatible with comprehensive water resource plans of a regional or river basin nature, said project does not necessarily relate to needs which may be associated with rural and urban runoff within the Raccoon River Basin.

Response: The Des Moines River Basin Feasibility Study considered problems and needs associated with rural and urban runoff within the Raccoon River Basin. Based on the identified needs, several alternative measures were studied. The flood damage reduction project at West Des Moines and Des Moines is the only economically feasible project from a Federal viewpoint.

Comment: To be assured of compatibility with state and local water resource interests, it is requested during post-authorization advanced engineering design that the following comments be considered.

1. Consideration be given to investigating the feasibility of channel cleanout or other structural or nonstructural flood plain management techiques to minimize the increase in stage or else mitigate the effects of an increased stage along Jordan Creek in the vicinity of the Chicago, Rock Island and Pacific Railroad bridge.

Response: Consideration will be given during post-authorization studies to the feasibility of channel cleanout or other structural or non-structural measures to minimize the increase in stage along Jordan Creek.

Comment:

2. Reconsideration be given to nonstructural and structural flood plain management techniques along the reach of Walnut Creek in an effort to provide as much flood protection as possible to property owners not presently included in the protection of the proposed project, and that such reconsideration include the possibility of further improving the channel capacity and floodwater conveyance along Walnut Creek in the vicinity of Grand Avenue.

Response: Flood protection along Walnut Creek in the vicinity of Grand Avenue will be reviewed during post-authorization studies.

Comment:

3. Reconsideration be given to the location of the river access and boat ramp adjacent to the Raccoon River and 63rd Street, such that the best possible location is achieved.

Response: Recreational development will be re-evaluated during post-authorization Studies to assure that plans remain compatible with state and local interests.

Comment: Benefits to be derived from the proposed project will exceed costs.

Response: Comment noted.

Comment: Although most of the significant environmental effects have been studied, all possible related mitigation measures should again be reviewed during post-authorization advanced engineering design.

Response: Environmental considerations will be reviewed during post-authorization Studies.

Comment: The impact on the Des Moines Water Works during the construction phase of the project needs to be addressed in the Environmental Impact Statement.

Response: Officials of the Des Moines Water Works have informed the District that the only impact of the proposed project on the Des Moines Water Works facilities will be the crossing of distribution lines by the proposed levee. These crossings will be considered in the detailed design of the project.

Comment: Subject to the preceding comments, I concur in the recommendations contained in the report and urge that the report be forwarded ro Congress for consideration at the earliest possible date.

Response: Comment noted.

9.048 Iowa conservation Commission

Comment: The removal of 22 acres of bottomland timber associations (8.02 Natural Resources 8.023, page 22) will represent a loss of mature woodland and woodland assocaited species; white-tailed deer, raccoon, opossum, squirrel, hawks, owls, woodpeckers, thrushes, warblers, etc. As stated it will be essentially irretrievable, but as any opportunity exists, extreme effort should be made to replace this specific environment whenever possible.

Response: Statements in the EIS agree with the above comment.

Comment: Loss of existing timber stands along the levee route from station 176+100 north will be affected as in (1(above and effort again should be made for habitat replacement.

Response: See preceding response.

Comment: As the levee will be seeded and construction areas seeded to herbaceous seedings; recommendations that grass stands that are established, not be mowed before August 1 of any growing season, are appropriate.

Response: Agree with above comment. However, this is a management recommendation and should be coordinated with the local sponsors who are responsible for project maintenance once it is completed.

Comment: Extreme caution should be taken is snowmobile design to avoid bisecting remaining timber stands with snowmobile trails so as to allow wildlife species to move away from intense activity areas into areas of suitable escape cover.

Response: The above comment will be given further consideration during post-authorization studies and re-evaluation of recreational development.

Comment: Every effort possible be made to allow remaining timber to be unaffected by man's imposition and to remain as natural as possible.

Response: Again this is a management comment and will depend upon the management and maintenance program by the local interests.

Comment: The main trail system be restricted to atop the levee system.

Response: See response to similar comment concerning snowmobile trail design.

Comment: Tom Putnam, fisheries biologist, felt "the proposed ramp sight is an ideal location for additional access to the Raccoon River. The proposed location adjoins 63rd Street and is easily accessible area for the public to reach. If the propose ramp is constructed, it is mandatory that the shoreline adjacent to it, both upstraeam and downstream, be riprapped to ensure stabilization of the bank. Without the riprap, the ramp will continually silt in and be of little use to the public."

Response: Recreational facilities design will be reviewed during post-authorizaation studies. Bank stabilization to protect the integrity of the ramp would appear reasonable.

9.05 Revised Draft EIS - Review by Local Interests

9.051 In September 1976 the revised draft EIS and feasibility report were provided for review to the local interests listed below. No comments on the revised draft EIS were received.

Iowa Natural Resources Council
Upper Mississippi River Basin Commission
Mayor, City of West Des Moines
City Manager, City of West Des Moines
Mayor, City of Des Moines
City Manager, City of Des Moines
Board of Water Work Trustees, City of Des Moines
Polk County Board of Supervisors
Polk County Soil and Water Conservation District
Central Iowa Regional Association of Local Governments
West Des Moines Chamber of Commerce
Des Moines Register And Tribune
West Des Moines Express
Iowa Power And Light Company
Northwestern Bell Telephone Company
Chicago, Rock Island, and Pacific Railroad
Chicago, Milwaukee, St. Paul, and Pacific Railroad
Chicago and Northwestern Transportation Company
West Des Moines Public Library
Cowles Library, Drake University
Iowa State University Library
Midwest Representative, Sierra Club
League of Women Voters of Des Moines
Izaak Walton League of America, Iowa Division
National Audubon Society

Mr. Jack A. Thorp
Glenn Construction Company
Martin-Marietta Central Division
Iowa Concrete Products Company
Penn-Dixie Cement Corporation
Johnnie's Vet's Club
Apex Concrete Company
Herberger Fabrics
West Des Moines State Bank
Hoak Construction Company
St. Regis Paper Company
Bill Brady and Sons Construction Inc.
Vivian L. Haag
Iowa Pool and Plumbing Supply Company
The Pathfinder Company
W.H. Jamison and Company
Clark A. Colby
Mr. William A. Boler
Mr. John W. Patterson
Mr. R.W. Messerschmidt
Mid-Iowa Snowmobile Club, Inc.
Iowa State Snowmobile Association

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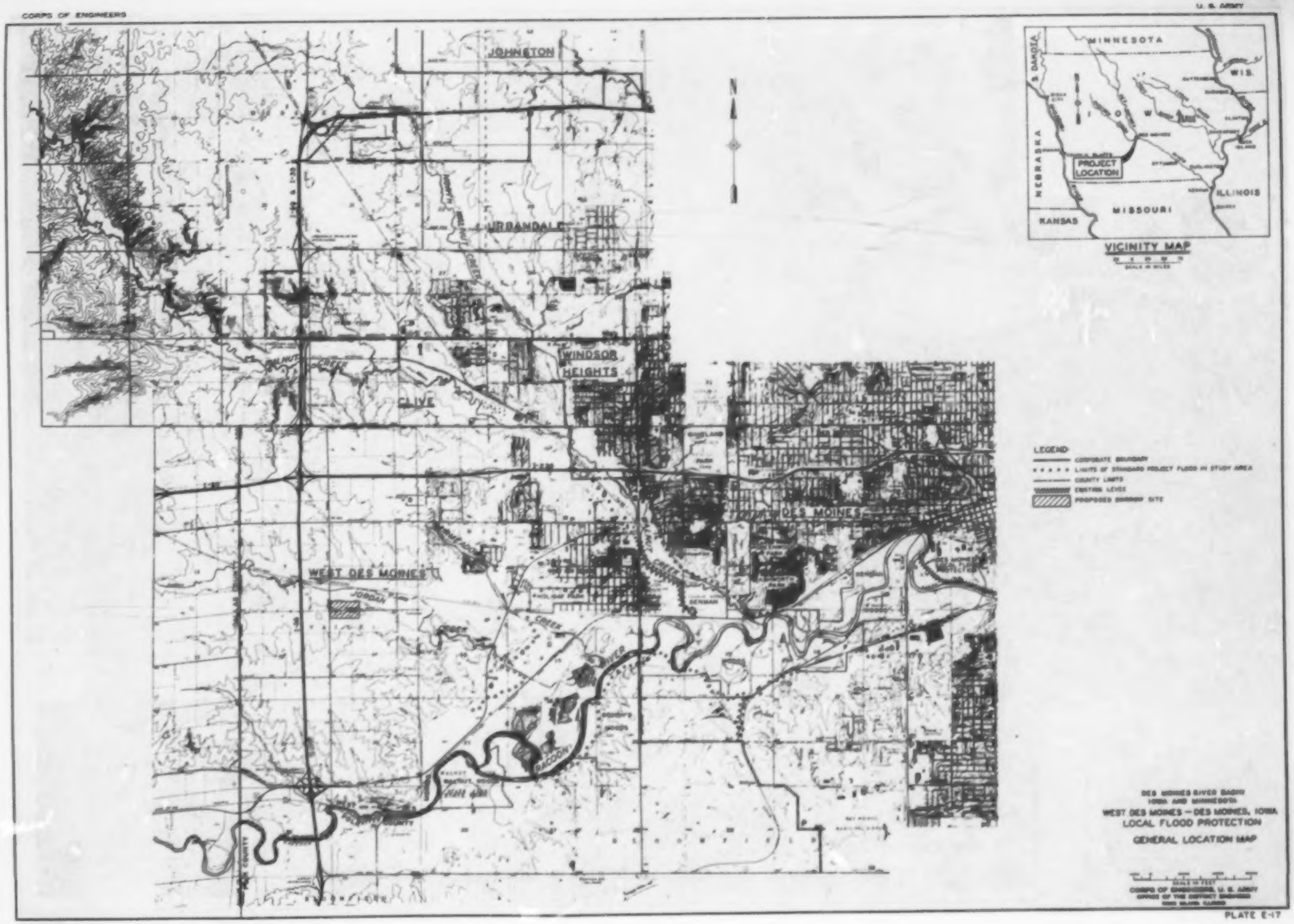
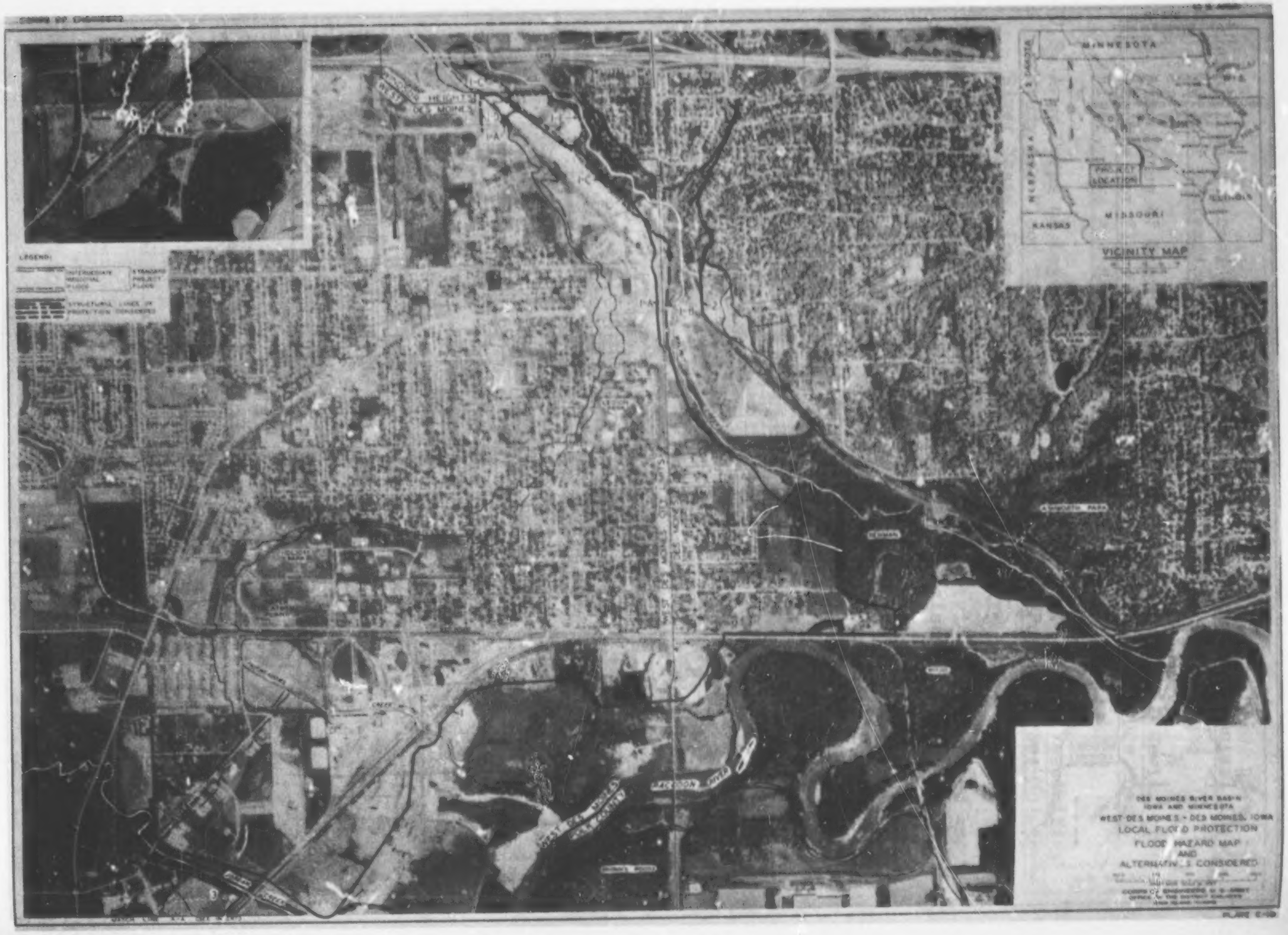

CORPS OF ENGINEERS
U. S. ARMY
JOHNSTON
URBANDALE
WINDSOR HEIGHTS
CLIVE
WALNUT CREEK
DES MOINES
WEST DES MOINES
JORDAN
RACCOON RIVER
N
MINNESOTA
S. DAKOTA
WIS.
NEBRASKA
IOWA
PROJECT LOCATION
ILLINOIS
MISSOURI
KANSAS
VICINITY MAP
SCALE IN MILES
LEGEND
CORPORATE BOUNDARY
LIMITS OF STANDARD PROJECT FLOOD IN STUDY AREA
COUNTY LIMITS
EXISTING LEVEE
PROPOSED BORROW SITE
SCALE IN FEET

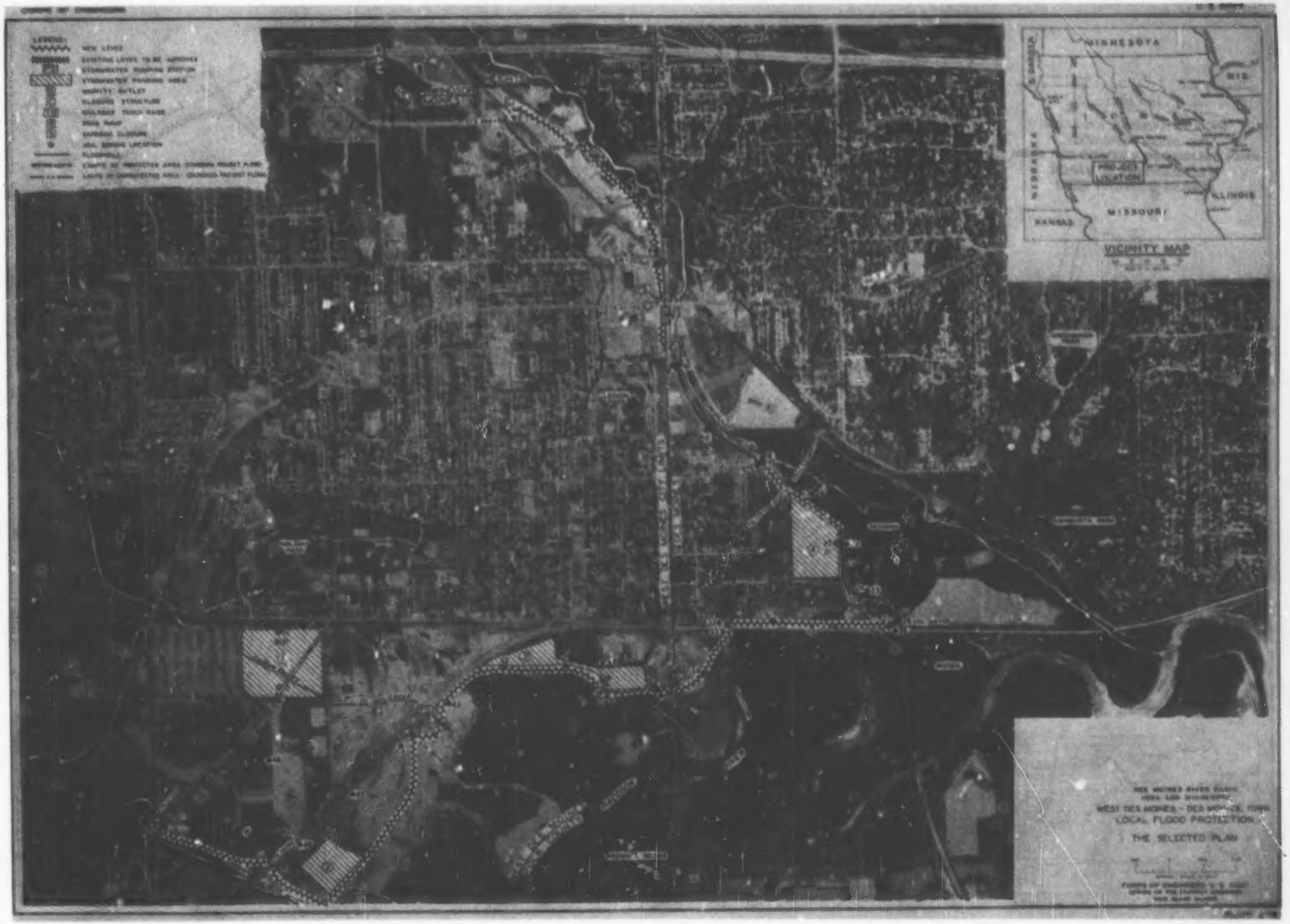
DES MOINES RIVER BASIN
IOWA AND MINNESOTA
WEST DES MOINES – DES MOINES, IOWA
LOCAL FLOOD PROTECTION

GENERAL LOCATION MAP

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ROCK ISLAND, ILLINOIS

PLATE E-17


CORPS OF ENGINEERS
MINNESOTA
S. DAKOTA
NEBRASKA
KANSAS
MISSOURI
ILLINOIS
WIS.
PROJECT LOCATION
VICINITY MAP
LEGEND:
INTERMEDIATE REGIONAL FLOOD
STANDARD PROJECT FLOOD
STRUCTURAL LINES OF PROTECTION CONSIDERED
WEST DES MOINES
POLK COUNTY
RACCOON RIVER
DES MOINES RIVER BASIN
IOWA AND MINNESOTA
WEST DES MOINES - DES MOINES, IOWA
LOCAL FLOOD PROTECTION
FLOOD HAZARD MAP
AND
ALTERNATIVES CONSIDERED
CORPS OF ENGINEERS U. S. ARMY
PLATE C-10


CORPS OF ENGINEERS
LEGEND:
NEW LEVEE
EXISTING LEVEE TO BE IMPROVED
STORMWATER PUMPING STATION
STORMWATER PONDING AREA
GRAVITY OUTLET
CLOSURE STRUCTURE
RAILROAD TRACK RAISE
ROAD RAMP
SANDBAG CLOSURE
SOIL BORING LOCATION
FLOODWALL
LIMITS OF PROTECTED AREA: STANDARD PROJECT FLOOD
LIMITS OF UNPROTECTED AREA: STANDARD PROJECT FLOOD
MINNESOTA
WIS.
S. DAKOTA
NEBRASKA
PROJECT LOCATION
ILLINOIS
KANSAS
MISSOURI
VICINITY MAP
DES MOINES RIVER BASIN
IOWA AND MINNESOTA
WEST DES MOINES - DES MOINES, IOWA
LOCAL FLOOD PROTECTION
THE SELECTED PLAN
CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
ROCK ISLAND, ILLINOIS

CORPS OF ENGINEERS U. S. ARMY

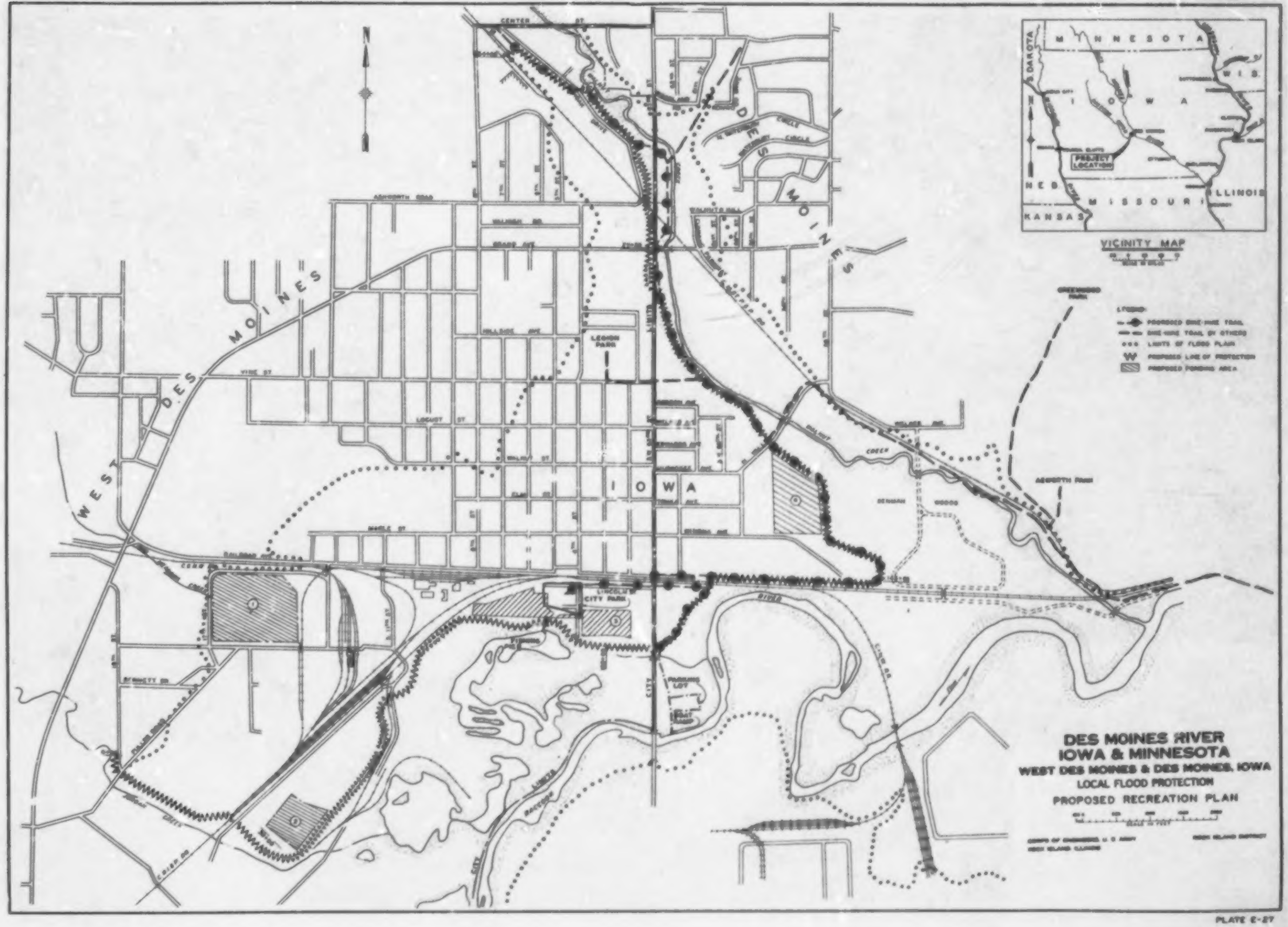

DES MOINES RIVER
IOWA & MINNESOTA
WEST DES MOINES & DES MOINES, IOWA
LOCAL FLOOD PROTECTION
PROPOSED RECREATION PLAN
SCALE IN FEET
CORPS OF ENGINEERS, U. S. ARMY
ROCK ISLAND, ILLINOIS
ROCK ISLAND DISTRICT
VICINITY MAP
MINNESOTA
S. DAKOTA
WIS.
IOWA
NEB.
MISSOURI
ILLINOIS
KANSAS
PROJECT LOCATION
LEGEND:
PROPOSED BIKE HIKE TRAIL
BIKE HIKE TRAIL BY OTHERS
LIMITS OF FLOOD PLAIN
PROPOSED LINE OF PROTECTION
PROPOSED PONDING AREA
GREENWOOD PARK
ASHWORTH PARK
BENHAM WOODS
WALNUT CREEK
DES MOINES
WEST DES MOINES
IOWA
CENTER ST
ASHWORTH ROAD
GRAND AVE
HILLSIDE AVE
VINE ST
LOCUST ST
MAPLE ST
RAILROAD AVE
LEGION PARK
LINCOLN CITY PARK
PARKING LOT
RIVER
RACCOON
CITY

PLATE E-27

FINAL ENVIRONMENTAL STATEMENT

WEST DES MOINES AND DES MOINES, IOWA
DES MOINES RIVER BASIN
LOCAL FLOOD PROTECTION

APPENDIX A

LETTERS OF COMMENT
RECEIVED ON THE DRAFT
ENVIRONMENTAL STATEMENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
1735 BALTIMORE — ROOM 249
KANSAS CITY, MISSOURI 64108

May 16, 1975

Colonel Walter J. Johnson, USA
District Engineer
Rock Island District
U.S. Army Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

Re: West Des Moines - Des Moines, Iowa
Local Flood Protection Project

We have reviewed the Draft Environmental Statement on the above referenced project. The project and statement have been rated ER-2. This rating means the Environmental Protection Agency (EPA) has environmental reservations with the project as proposed and requests additional information be provided in the final statement to permit a full assessment of the project's impacts. Our primary concern is the potential for the contamination of the Des Moines public water supply system. The following are our comments:

Water Supply

The principle source of drinking water for the City of Des Moines is the infiltration galleries which run parallel to the Raccoon River. The statement should show the location of these galleries on the project maps. An evaluation of the potential infiltration of pollutants from the ponding areas adjacent to the Raccoon River should be included in the final statement. This would permit an assessment of possible health risks from pollutants introduced into the public water supply. The draft statement and Feasibility Study indicate that project induced urban and industrial development will occur within the protected area of the levee project. An assessment should be provided which discusses the possible influence this induced development may have on the water quality of the Raccoon River and the Des Moines public water supply.

If the Administrator of EPA, upon review of the final project design, determines that a possible contaminant introduction to the recharge zone surrounding these galleries could result in a significant hazard to public health, he will publish this determination and no commitment for federal financial assistance may be entered into for this project until a new plan or design alleviates the hazard (Safe Drinking Water Act, PL.93-523).

Water Quality

The final statement should provide information on anticipated water quality of the proposed storm water ponding areas. An evaluation of the potential health risks associated with ponding storm water near residential developments should be specifically included for ponding areas one and four.

The location of the 44-acre tract of land for proposed borrow material extraction is adjacent to the headwaters of Jordan Creek. An assessment of potential construction impacts to Jordan Creek from the extraction operation should be provided. This should include information on potential adverse effects on the aquatic environ of Jordan Creek from erosion, siltation and equipment maintenance (fuel and oil spillage). Measures to control these potential impacts to Jordan Creek should also be identified.

Interior Drainage

Appendix I, pages E-75 through E-80, provides an evaluation of the proposed interior drainage protection. The report should provide an assessment of these ponding areas with respect to their adequacy in providing protection for future West Des Moines development. With additional development, urban runoff will increase and this, in turn, may necessitate future interior drainage requirements such as ponding areas, ditches and pump stations. The final statement should address the possibility that following project completion and future urban development adjacent to the ponding areas, these ponding areas may no longer serve their designed function.

Borrow Material

Appendix I, page E-70, states the required borrow material will be supplied from ponding area four and a 44-acre tract of farm land. Plate E-21 provides information on soils from the 52 borings taken in the project area. From this information, it appears that additional levee material could be extracted from the proposed ponding areas three and one, thus reducing the agricultural land consumption for borrow material. The final statement should discuss the possible reduction in farm acreage loss by utilizing these other sites.

Downstream Impacts

Page 14 of the draft statement and page E-63 of the Feasibility Study indicate a minor increase in the flood profile and velocity will occur in the Walnut and Jordan Creek areas. Plates E-14, E-15 and E-16 show water surface profiles with existing conditions. Information on water surface profiles with the proposed improvements should also be presented. The change in the degree of flood protection for Des Moines, resulting from increased flood stages due to this project, should be evaluated in the final statement.

We appreciate this opportunity to comment on the draft statement. Please furnish our office with three copies of the final statement when it is filed with the Council on Environmental Quality.

Sincerely yours,

Jerome H. Svore
Regional Administrator

United States Department of the Interior

BUREAU OF MINES
WASHINGTON, D.C. 20240

OFFICE OF THE DIRECTOR

ER-75/314

May 16, 1975

Memorandum

To: District Engineer, Corps of Engineers, Rock Island, Illinois

Through: Deputy Assistant Secretary--Energy and Minerals Roland R. Reid
MAY 28 1975

From: Director, Bureau of Mines

Subject: Draft environmental statement, Corps of Engineers, West Des Moines-Des Moines, Iowa, Local Flood Protection, Polk County, Iowa

Our Intermountain Field Operation Center, Denver, has reviewed the draft environmental statement prepared by the Corps of Engineers pertaining to a project for local flood protection in West Des Moines and Des Moines, Iowa. Project elements consist of repair of an existing levee and construction of 5 miles of new levees along the north bank of Raccoon River, the west bank of Walnut Creek, and the north bank of Jordan Creek within the city limits.

Known mineral resources of the area include sand and gravel and deeply buried thin beds of coal. The statement acknowledges the existence of these resources (p. 4).

Sand and gravel has been mined along the southwestern end of the project area, and three gravel pit lakes occupy about 90 acres. The statement neither mentions these sites nor explains whether sand and gravel is currently being produced near the area. We suggest that the final statement discuss this matter as well as the effect of the project on future production. The deeply buried coal in the area is of little value.

Because the entire project is within the city limits, we believe that construction should not significantly alter the availability of mineral resources in the area.

TV Falkie
Thomas V.
Director

United States Department of the Interior
BUREAU OF OUTDOOR RECREATION
MID-CONTINENT REGION

MAILING ADDRESS:
Post Office Box 25387
Denver Federal Center
Denver, Colorado 80225

STREET LOCATION:
603 Miller Court
Lakewood, Colorado
Telephone 234-2634

IN REPLY REFER TO:
D6427
ER 75/314

MAY 11 1975

Colonel Walter H. Johnson
District Engineer
Rock Island District
Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

We have reviewed the draft environmental statement and feasibility report for flood protection, Des Moines River Basin, Polk County, Iowa, as requested in your letter of March 26, 1975, to John W. Larson of the Department of the Interior in Washington, and have the following comments to offer:

Feasibility Report

Based on data as provided in this report, parks which have received funding from the Land and Water Conservation Fund will not be adversely affected by the levee project in West Des Moines.

We fully support the recreation plan discussed in the report on page E-68 of using the levees for such purposes as hiking, bicycling, nature study, bird watching, and picnicking. This plan should complement the riverfront recreational development plan being considered by the City of Des Moines.

Consideration should be given, in this project, to acquiring additional land in the 63rd and Railroad Avenue area to provide public access to the Raccoon River for recreation purposes.

We also suggest that the Corps should study the feasibility of extending the levee around the 200-acre sand pit lake near the Martin Marietta Corporation. This would allow the site to eventually be fully developed for recreation purposes without loss or damage to the facilities from flooding.

We believe that if the three proposals mentioned above are included in the project, the full recreation potential will be realized.

Draft Environmental Statement

The statement covers outdoor recreation and related environmental matters as it relates to this project in a satisfactory manner. However, it would be desirable if the environmental statement was expanded to show the interrelationship of this project to the riverfront recreational development plan being considered by the City of Des Moines.

Sincerely,

for
Robert J. Arkins
Assistant Regional Director
Land Use Coordination

cc: BOR, WASO

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Federal Building - Room 1748
601 East 12th Street
Kansas City, Missouri 64106

May 8, 1975

Colonel Walter H. Johnson
District Engineer
U.S. Army Corps of Engineers
Rock Island District
Clock Tower Building
Rock Island, IL 61201

Dear Colonel Johnson:

We have reviewed the draft environmental statement and feasibility report for local flood protection in the Des Moines River Basin, Polk County, Iowa, and offer our comments. Most of the comments are restricted to the environmental statement and sections of the feasibility report pertinent to the subject project.

General Comments

In general, the potential fish and wildlife losses are adequately described. However, these losses and the cost of replacing them should be identified as project costs and distributed among appropriate project functions. Specific measures to compensate for wildlife losses should be outlined in the environmental statement.

The information presented on rare and endangered species is not complete. The exact status of each species in the project area should be established and presented in the final environmental statement.

Wildlife values were apparently not fully considered in the study of alternate alignments. Wildlife aspects of all alternates should be discussed. Alternate alignment 1-C, which proposed raising a portion of Hoak Drive as a part of the line of protection, would be less detrimental to wildlife habitat. Also, the encroachment into the northwest portion of Denman Woods and the wooded area east of North Valley Drive could be avoided by a minor change in alignment. We strongly recommend that these changes in alignment be incorporated into the selected plan in order to lessen the impact of the project on wildlife resources.

best copy available

Zoning designed to restrict further industrial and residential encroachment into the floodplain should be a prerequisite to any flood protection plan. In many cases such development destroys more wildlife habitat than construction of the project. We realize that zoning is the responsibility of local authorities, but we maintain that it could be included as a project requirement in the negotiated agreement between the Federal Government and local sponsors. In our opinion, realizing project benefits for the protection of future developments in the floodplain performs quite the opposite function and condones poor floodplain management at the expense of natural environmental values.

Specific Comments (Draft EIS)

1.011. Portions of the existing levee have vegetative cover valuable to wildlife. We recommend repair work be restricted to areas where it is most needed instead of general reconstruction of the entire levee. Plans for this repair work should be discussed in the final EIS.

2.0226. The exact status of the showy orchis in the project area should be established. A slight adjustment in the proposed alignment would allow the project to avoid encroachment upon Denman Woods and would ensure that none of these plants would be disturbed.

4.0265. We recommend that native plant species be considered for the seeding and planting program. These species would provide more requirements of resident wildlife than exotic plant species. Wildlife values should also be considered when choosing seed mixtures for erosion control seeding. We realize native prairie species do not establish quickly enough to provide early erosion control needs. However, they are extremely competitive once they become established, and we recommend their use in selected areas with low erosion potential. The variety of species in this group provides many forms and colors, supplies plant diversity valuable to wildlife, and diminishes the need for maintenance since neither mowing or blanket spraying is needed for weed control.

4.0292. The integrity of the areas near the streams should be protected by minimizing the number of access roads beyond the levee, restriction of motorized recreational vehicles (e.g. motorcycles, snowmobiles, and all terrain vehicles) to access roads only, and emphasis of natural environmental values in areas designated for future park development. The recreational plan should also include measures to restrict motorized vehicles from footpaths or bicycle paths along the levee crown. Although these vehicles are highly used by the public for recreational purposes, their use is often incompatible with the ecology of natural or wildlife areas. The existing levee shows evidence of high use by these vehicles, and we recommend a safeguard restricting such use on both the old and new levee be written into the project agreement.

Thank you for the opportunity to provide our comments.

Sincerely yours,

Charles K. Phenicie

Charles K. Phenicie
Area Manager

cc: RD, Denver, CO (ES)
IA Cons. Comm.
OEC

March 3, 1849

United States Department of the Interior

NATIONAL PARK SERVICE
MIDWEST REGION
1709 JACKSON STREET
OMAHA, NEBRASKA 68102

IN REPLY REFER TO:

L7619 MWR CE
(ER-75/314)

MAY 13 1975

Colonel Walter H. Johnson
Corps of Engineers
District Engineer
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

The draft environmental statement for Flood Protection, Des Moines River Basin, Polk County, Iowa, has been reviewed by the National Park Service.

We are pleased to note the careful review that has been made of historic and archeological sites in this document. This review appears to be in substantial compliance with the procedures for the protection of historic and cultural properties established by the Advisory Council on Historic Preservation and published in 36 CFR Part 800 and also in Federal Registers of January 25, 1974 (copy enclosed) and February 4, 1975.

We would, however, call your attention to Section 800.4 of these procedures wherein Federal agencies are directed to identify cultural properties included in or eligible for inclusion in the National Register of Historic Places. Please note in Section 800.4(a)(2) that the identification of eligible properties is to be made in consultation with the State Historic Preservation Officer (with a subsequent determination of eligibility made by the Secretary of the Interior) and, in Section 800.4(b), that a determination of effect on an included or eligible historic property is also to be made in consultation with this officer.

No evidence of consultation with the State Historic Preservation Officer for Iowa, Mr. Adrian Anderson, B-13 MacLean Hall, Iowa City, Iowa 52242, has been presented, although it is stated (page 17 of the EIS) that coordination will be maintained with the State Historic

Preservation Officer in the event that additional sites may be discovered during the actual construction period. It is our understanding that the Environmental Research Company works closely with the State Historic Preservation Officer in all phases of study; however, this does not make Corps consultation with the SHPO unnecessary.

The possibility that eligible Register sites are present which would be affected (beneficially or adversely) by the project should be explored in consultation with the SHPO and the determination of no effect on the Jordan House (paragraph 4.02103 of the EIS) should also reflect that it was made in consultation with Mr. Anderson.

Sincerely yours,

Merrill D. Beal

Merrill D. Beal
Regional Director

Enclosure

United States Department of the Interior

GEOLOGICAL SURVEY
RESTON, VIRGINIA 22092

OFFICE OF THE DIRECTOR

JUL 3 1975

Colonel Walter H. Johnson
Department of the Army
Rock Island District, Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

We have reviewed the draft environmental statement and feasibility report for Flood Protection, Des Moines River Basin, Polk County, Iowa, and we offer the following comments.

As pointed out by the Corps, chances are that flood protection will induce urbanization and development of the flood plain. For Walnut Creek, flood protection is proposed for the lower reaches of the stream. The Walnut Creek basin is also one of the rapidly urbanizing basins in the State. Hence, flood magnitudes can be expected to increase owing to development throughout the basin. The proposed project, consisting of levees and floodwall, will consequently become even more effective as time goes on. Designing the project to protect against the 200-year flood is a step toward accommodating the higher flood magnitudes of the future that may result from basin development.

Walnut Creek basin is relatively small and is subject to flash flooding. This will pose a serious problem in project operation because of the short time available to make the necessary closures in the levee system. For example, it is noted (p. E-36, feasibility report) that the fast rise in July 1973 resulted in little emergency action being taken. The feasibility report does mention that a flood-warning system will be established. However, no additional information is given on the type of flood-warning system contemplated and how it would operate.

It is noted that one of the alternative levee alignments considered in Section VI has been rejected because it would increase the 100-year flood stages in the residential area on the opposite bank by 2.5 feet, requiring that a levee be constructed around that residential area (p. 21, paragraph 6.066). However, no quantitative estimate has been noted in the draft environmental statement of the impact of the proposed levees on flood levels on the opposite bank. Since levees are proposed only on one side of Walnut Creek, and no existing levees are shown on the opposite bank, which is also developed (Plates E-17 and E-18), it would be advisable to provide an evaluation of this possible impact.

In paragraph 45, p. C-17, of the feasibility report, the April 1965 volume at Saylorville should be 693,410 cfs-days.

Table C-5, page C-28, feasibility report, gives 7-day, 10-year low flow as 200 cfs for the Des Moines River at Des Moines. Our analyses indicate that this flow parameter is about 80-85 cfs for natural conditions. Perhaps the 200 cfs is the expected regulated low flow after the Saylorville Reservoir is in operation.

Paragraph 65, page C-31, feasibility report, should indicate that the sediment loads given are average annual loads.

It is suggested that the 70 acres of flood plain to be occupied by four ponding areas for interior drainage be mentioned specifically in the summary of environmental impacts (first two pages, paragraph 3a). The reference to Section VI on page 19 (paragraph 5.02) should be changed to Section IV. In the glossary definition of Pleistocene, "this is the present geologic time period..." should be changed to "this is the earlier of the two epochs comprising the Quaternary geologic time period..."

Acting Director

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
NORTHEASTERN AREA, STATE AND PRIVATE FORESTRY
6816 MARKET STREET, UPPER DARBY, PA. 19082
215-597-3772

8400
May 16, 1975

Colonel Walter H. Johnson
District Engineer, Rock Island District
Department of the Army
Clock Tower Building
Rock Island, Illinois 61201

Refer to: NCRED-PB, Draft Environmental
Statement, West Des Moines-
Des Moines Flood Protection

Dear Colonel Johnson:

Our Milwaukee office referred the above statement to us for review and comment as no National Forest lands are involved.

The Corps has provided for adequate preservation of woodland compatible with the purposes of the project. To enhance natural resources as well as preserve them, the final statement could include plans for establishing wildlife cover where practical.

Thank you for the opportunity to review this statement.

Sincerely,

DALE O. VANDENBURG, Group Leader
Environmental Improvement

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

823 Federal Building, Des Moines, Iowa 50309

May 2, 1975

Colonel Walter H. Johnson
Rock Island District Engineer
U. S. Army Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

The draft environmental impact statement for the proposed West Des Moines local flood protection project addressed to this office on March 26, 1975 has been received and reviewed.

We have no comments at this time.

The Soil Conservation Service, through the local conservation district, would be happy to provide assistance with general soil site preparation.

We appreciate the opportunity to review and comment on this proposed work.

Sincerely,

Wilson T. Moon

Wilson T. Moon
State Conservationist

DEPARTMENT OF TRANSPORTATION
REGIONAL REPRESENTATIVE OF THE SECRETARY
ROOM 634, FEDERAL BUILDING
601 EAST 12th STREET
KANSAS CITY, MISSOURI

REGION VII

April 30, 1975

Colonel Walter H. Johnson
District Engineer
Rock Island District Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

The Draft Environmental Statement and the Interim Draft Feasibility Report for a proposed local flood protection project at West Des Moines-Des Moines, Iowa, has been reviewed by the Department of Transportation and our comments are as follows:

The Draft EIS indicates material for the levee construction will be obtained from a borrow area located 2.5 miles from the project. The location of this borrow area and haul routes needed to transport the material to the project should be identified. The following impacts along the haul routes and resulting from the material hauling process should be discussed in the Final Statement.

1. Additional roadway or bridge maintenance costs.
2. Safety measures during hauling operations.
3. Impacts on noise and air quality.

Thank you for the opportunity to review and comment on these documents.

Sincerely,

R. R. Waesche
RADM USCG (Ret.)
Secretarial Representative
Region VII

cc:
Mr. John B. Kemp, FHWA
RADM G. H. P. Bursley, USCG
Mr. William E. Loftus, FRA

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
REGIONAL OFFICE
ROOM 300, FEDERAL OFFICE BUILDING, 911 WALNUT STREET
KANSAS CITY, MISSOURI 64106

March 31, 1975

REGION VII

IN REPLY REFER TO
7CE

Mr. Walter H. Johnson
Colonel, Corps of Engineers
Department of the Army
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

This is to acknowledge receipt of your Draft Environmental Impact Statement and Interim Draft Feasibility Report for local flood protection at West Des Moines - Des Moines, Iowa, dated March 1975.

HUD programs for the area in which the project is located are administered by Guy Birch, Director, Omaha Area Office. By copy of this letter, Mr. Birch is requested to review the draft statement and report his comments directly to you within 45 days as indicated in your request.

Thank you for the opportunity to comment on this statement.

Sincerely,

Harry B. Bearman

Harry B. Bearman
Environmental & Standards Officer
Community Planning and Development

Advisory Council
On Historic Preservation
1522 K Street N.W. Suite 430
Washington D.C. 20005

May 2, 1975

Colonel Walter H. Johnson
District Engineer
Rock Island District, Corps of Engineers
U. S. Department of the Army
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

This is in response to your request of March 26, 1975 for comments on the environmental statement for the proposed local flood protection project at West Des Moines-Des Moines, Iowa.

Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that your draft environmental statement appears procedurally adequate. However, to ensure a comprehensive review of historical, cultural, archeological, and architectural resources, the Advisory Council suggests that the final environmental statement contain evidence of contact with the Iowa State Historic Preservation Officer and that a copy of his comments concerning the effects of the undertaking upon these resources be included.

Should you have any questions or require additional assistance, please contact Jordan Tannenbaum of the Advisory Council staff at 202/254-3380.

Sincerely yours,

John D. McDermott
Director, Office of Review
and Compliance

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGION VII
FEDERAL BUILDING
601 EAST 12TH STREET
KANSAS CITY, MISSOURI 64106

OFFICE OF
THE REGIONAL DIRECTOR

May 2, 1975

Walter H. Johnson, Colonel
Department of the Army
Rock Island District,
Corps of Engineers
Clock Tower Building
Rock Island, Illinois 64106

RE: Draft Environmental Impact Statement
West Des Moines - Des Moines, Iowa
Local Flood Protection

Dear Colonel Johnson:

Review of the above referenced document indicates that there is no apparent impact on programs of the Department of Health, Education and Welfare. It would appear that the impacts of the proposed action and the reasonable alternatives have been adequately addressed.

Thank you for this opportunity to review and comment relative to your anticipated actions.

Sincerely,

William H Henderson

William H. Henderson
Regional Environmental Officer

STATE OF IOWA

Office for Planning and Programming

523 East 12th Street, Des Moines, Iowa 50319 Telephone 515/281-3711

ROBERT D. RAY
Governor

ROBERT F. TYSON
Director

May 19, 1975

Colonel Walter H. Johnson
Department of the Army
Rock Island District, Corp of Engineers
Clock Tower Building
Rock Island, IL 61201

PNRS Number 7571049
Draft Environmental Statement and
Interim Draft Feasibility Report
West Des Moines - Des Moines, Iowa

Dear Colonel Johnson:

The Iowa State Clearinghouse has distributed the above-named draft Environmental Statement to those state and other agencies which may have an interest in it. Copies of any comments received from them are attached.

The Iowa State Clearinghouse appreciates the opportunity to have reviewed this statement and to afford other state agencies the same opportunity. As there seem to be no serious objections to the statement, the Clearinghouse is hereby closing its review.

Sincerely,

A. Thomas Wallace

A. Thomas Wallace
Federal Funds Coordinator

ATW/pc

Attachment

Iowa a place to grow

THE IOWA STATE HIGHWAY COMMISSION

· 515-296-1101 · AMES, IOWA 50010

H. E. GUNNERSON
Director – Chief Engineer

D. E. McLEAN
Deputy Director
Deputy Chief Engineer

April 28, 1975

REFER TO:
Letter of Intent
Project: 751049
Corps of Engineers
Des Moines Flood Control

Mr. A. Thomas Wallace, Jr.
Federal Funds Coordinator
Office for Planning and Programming
523 East 12th Street
Des Moines, Iowa 50319

Dear Mr. Wallace:

I have reviewed the above PNRS Letter of Intent. The project does not appear to conflict with any highway improvements presently programmed by the Iowa State Highway Commission.

Thank you for the opportunity to review this project.

Very truly yours,

TF Jackson
for Robert L. Humphrey
Project Planning Engineer

TFJ/nec

COMMISSIONERS
JIM D. BIXLER, CHAIRMAN–COUNCIL BLUFFS
THOMAS A. BATES–BELLEVUE
LES LICKLIDER–CHEROKEE
JOHN G. LINK–BURLINGTON
CAROLYN T. LUMBARD–DES MOINES
HERBERT T. REED–WINTERSET
JOHN C. THOMPSON–FOREST CITY

IOWA

FRED A. PRIEWERT, Director
300 Fourth Street, Des Moines, Iowa 50319
515/281-5145

An EQUAL OPPORTUNITY Agency

May 16, 1975

Colonel Walter H. Johnson
District Engineer
U. S. Army Corps of Engineers
Rock Island District
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

The Iowa Conservation Commission staff was given the opportunity to review the draft environmental statement and feasibility report for local flood protection in the Des Moines-West Des Moines area for the Raccoon River, Walnut Creek, and Jordon Creek. The following comments were received:

1. Certain alignment changes within the levee system would avoid encroachment upon Denman Woods.

2. Present recreational opportunities that are listed does not include snowmobiles. A properly designed and managed multi-purpose trail that includes snowmobiles would provide a link to larger areas outside of the metropolitan area for a large urban population.

3. The planting and seeding programs for the construction areas including the ponding areas would best be served by native plant species.

4. The recommendation for a river access in the vicinity of the 63rd Street bridge is very valid and is a needed recreational facility.

5. The feasibility of extending the levee system around the Martin Marietta sand and gravel operation should be investigated for protection of the future recreation area.

Thank you for giving up the opportunity to review the statement and provide our comments.

Sincerely,

Darrell Hayes

Darrell Hayes
Planning Aide

DH:DB:rh

May 6, 1975

Statement of
Iowa Natural Resources Council
at
Public Meeting May 6, 1975
Valley High School, West Des Moines, Iowa
Regarding
West Des Moines - Des Moines, Iowa
Local Flood Protection

The Iowa Natural Resources Council is aware that serious flood problems do exist along Walnut Creek and the Raccoon River at the Cities of West Des Moines and Des Moines.

The recommended project as proposed does provide a relatively high degree of flood protection for the Cities of Des Moines and West Des Moines. The level of protection provided by the project meets the criteria of the Resources Council relating to levees and flood walls constructed for flood control. The alignment of the recommended levee and floodwall is consistent with the criteria of the Resources Council relating to flood plain encroachment.

The recommended project represents an economical alternative available for reducing flood damages in the Cities of Des Moines and West Des Moines consistent with the constraints of the authorization which permits the Corps of Engineers to participate in the project development.

The Iowa Natural Resources Council believes there is a need for implementation of a structural program and non-structural alternatives for managing the flood damages of the Raccoon River and Walnut Creek in the Cities of Des Moines and West Des Moines and urges the Corps of Engineers to proceed with the completion of the report and submit it to their higher authority for appropriate action consistent with the desires of the affected communities.

For the Iowa Natural Resources Council

Othie R McMurry

Othie R. McMurry, Director

STATE HISTORICAL DEPARTMENT OF IOWA
DIVISION OF HISTORIC PRESERVATION

ADRIAN D. ANDERSON, DIRECTOR
HISTORIC PRESERVATION OFFICER

June 10, 1975

Walter H. Johnson
Colonel, District Engineer
Corps of Engineers
Rock Island District
Clock Tower Building
Rock Island, Illinois 61201

Re: West Des Moines Local Flood Protection Project

Dear Colonel Johnson:

I appreciate the opportunity to review the West Des Moines Flood Control Project. As a result of our investigations it has been determined that this project will have no apparent affect upon houses either on or eligible for inclusion on the National Register of Historic Places. It is my understanding that field surveys have not identified archaeological resources in the project area, nor have such archaeological resources been identified in designated borrow areas. If different, unsurveyed borrow areas are designated, however, they should be investigated prior to use.

We shall be happy to assist your staff in this work to the extent that we are able.

Sincerely,

Adrian D. Anderson, Director
Historic Preservation Officer

ADA:pah

City of West Des Moines

MUNICIPAL BUILDING 318-5th
WEST DES MOINES, IOWA 50265
TELEPHONE (515) 255-1161

[illegible]

May 5, 1975

Walter H. Johnson
Colonel, Corps of Engineers
District Engineer
Rock Island, Illinois 61201

Dear Colonel Johnson:

The Mayor, City Council, Administrative and Technical staff of the City of West Des Moines, Iowa, have reviewed very carefully the Draft Feasibility Study and Environmental Statement prepared by the United States Army Corps of Engineers relating to local flood protection, filed with this community in March 1975. The selected plan of improvements appears to be in accord with benefits desired and the City Council of the City of West Des Moines agrees to this communities share of local participation and responsibility.

Almost all of the main channel of the Raccoon River and Walnut Creek is located outside the corporate boundaries of this city, yet our people have endured substantial damage over the years because of the flooding of these streams. Facts attesting to the extent are very well outlined in the report from the Corps of Engineers. The only regret we have is that the Study and Plan as proposed was not done years ago. We urge immediate consideration and Congressional approval for early implementation.

We wish to extend our sincere appreciation to the U. S. Corps of Engineers and to other governmental and private interests for their efforts in furnishing and compiling data as contained in the draft report and submission of the selected plan.

By Order of the West Des Moines
City Council

Murray E. Drake

Murray E. Drake
Mayor

MED/EPT/dn

city of des moines

Office of the City Manager

April 24, 1975

Colonel Walter H. Johnson
District Engineer
U.S. Army Engineer District, Rock Island
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Johnson:

At its meeting of April 21, 1975 by Roll Call No. 1726, the Des Moines City Council received and filed the U.S. Army Corps of Engineers' feasibility study on the Walnut Creek Flood Protection Project dated March, 1975. At that time the Council directed that I communicate to the Corps of Engineers the City's interest, desire and willingness to participate in the design memorandum and final design plans.

This action was taken following the City Administration's review of the West Des Moines-Des Moines, Iowa Local Flood Protection Project Feasibility Study resulting in the determinations that it is a good project and should be advanced with all haste.

Should you desire any further information, please contact my office.

Sincerely,

Richard Wilkey

Richard Wilkey
City Manager

RW/mlb

cc: Public Works Director
City Engineer

DES MOINES WATER WORKS
BOARD OF WATER WORKS TRUSTEES
1003 LOCUST STREET
DES MOINES, IOWA 50307

MAURICE A. KING
GENERAL MANAGER

April 4, 1975

Colonel, Walter H. Johnson
District Engineer
Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

RE: NCRED - PB

Dear Colonel Johnson:

The Interim Draft Feasibility Report concerning flood protection in the vicinity of Walnut Creek and Raccoon River in the City of Des Moines has recently come to our attention.

We have reviewed the report and comment that as we understand the plan it will involve land owned, operated, and maintained by the Board of Water Works Trustees of the City of Des Moines.

As shown on Plate E-19 of the report, it appears that construction would occur on land owned by the Board of Water Works Trustees. The Board owns all of the land on both sides of Walnut Creek and Raccoon River in Sections 12 & 13, T 78N, R 25W. It would be helpful if you could furnish to us the proposed construction plans in this area so that we may review them for possible effect on our installations.

Your cooperation in this matter will be appreciated.

Very truly yours,

BY

Maurice A. King
General Manager

HKD:LM

cc: H. King Dawson

Chamber of Commerce of West Des Moines

221 5th Street, West Des Moines, Iowa 50265
(515) 279-7766

May 6, 1975

Department of the Army
Rock Island District
Corps of Engineers
Rock Island, Illinois 61201

Gentlemen:

The advantages to the cities of West Des Moines and Des Moines in adequate flood control measures should be obvious to everyone and should need no overt support from any group or individual. We need only consider the benefits to be gained by some 922 residences, 143 commercial properties, and 22 light industries to feel secure in supporting such flood control measures as are now being proposed.

Therefore, upon formal action taken Thursday, May 1, 1975, the Board of Directors of the Chamber of Commerce of West Des Moines endorses the concept of the flood control measures as presented by the United States Army Corps of Engineers.

We urge that the proper bodies move forward with all haste to make adequate flood control preparations for our community.

Sincerely,

James L Crosby

James L. Crosby, President

JLC:hc

MARTIN MARIETTA AGGREGATES

CENTRAL DIVISION
4096 FIRST AVENUE, N.E.
CEDAR RAPIDS, IOWA 52406
TELEPHONE (319) 364-0201

GENE M. MASON
VICE PRESIDENT & GENERAL MANAGER

May 15, 1975

Col. Johnson, District Engineer
U. S. Army Engineers
Clock Tower Building
Rock Island, Illinois 61202

Re: Feasibility study for flood damage reduction and related purposes, Des Moines River Basin, March, 1975

Dear Col. Johnson:

The management of the Central Division of Martin Marietta Aggregates has reviewed the selected plan for the above project.

Upon reviewing the proposed location of the levee on our property, it appears the levee is routed through our sand and gravel plant. We therefore are requesting that at the time the Raccoon River floodway is established, the levee section which starts at Station 19 + 50 and is parallel to Jordan Creek be extended easterly to the edge of the plant area. The levee then will proceed northerly along the plant area, and tie back into proposed levee alignment above Station 60 + 00 near where the pump station symbol is shown on your map (see attached map).

Sincerely,

Gene M. Mason

GM:bh

An "on-site" inspection of the property will point out the detrimental effects at the proposed location.

ISSA
Iowa State Snowmobile Association

May 12, 1975

Dear Colonel Johnson,

It has been brought to my attention that a proposed levee system for flood- control be built in the Des Moines, West- Des Moines area.

The Iowa State Snowmobile Association would favor a Multi-purpose Trail system be incorporated with this project.

Recreation is a vital part of todays Society, and Horseback riding, Bicycling, Hiking, Cross- Country Skiing and Snowmobiling are all forms of recreation which are compatible on a Multi- purpose Trail System.

The City of Duluth, Minnesota is a fine example of how a Trail system can be incorporated in a metropolitan area. This can provide recreational oppertunities for many people.

The Iowa State Snowmobile Association would be glad to work with the Army Corps of Engineers, the Iowa State Conservation Commission and any local Des Moines Organizations in any way we can to help develop a Multi-purpose Trail system to enhance a Flood-control project.

Sincerely,

Richard Grosse
President- I.S.S.A.
7543 Ford Road
Cedar Falls, Iowa
50613

MID-IOWA SNOWMOBILE CLUB, INC.
P.O. Box 2722
Des Moines, Iowa 50315

May 5, 1975

The Mid-Iowa Snowmobile Club, a group of Polk County residents incorporated and interested in winter sports, particularly snowmobiling, would like to comment on the proposed Raccoon River, Walnut Creek, and Jorden Creek flood protection project.

Having read the Corps of Engineers Feasibility Study of the above project, we agree with the intent and general concept as outlined. In addition, we feel it would serve the residents of West Des Moines and Des Moines if the proposed levees were constructed for, and designated as, multipurpose recreation trail systems.

It is well established and documented that properly designed and designated trail systems provide an opportunity for safe outdoor recreation. By providing multipurpose use areas such as those designed for golfing, horseback riding, baseball, tennis, and many other outdoor sports, the community offers all residents the means to persue the activity of their choice. This fact must be considered for winter as well as summer usage.

Polk County and its residents need multipurpose recreational areas such as the trail system proposed. The Mid-Iowa Snowmobile Club therefore endorses and encourages that the Raccoon River, Walnut Creek, and Jorden Creek Project levees be designated as multipurpose use areas.

Wm B. Graham III
William B. Graham III
President

IOWA POWER
823 Walnut Street
Des Moines, Iowa 50309
515-281-2900

Guy G. Gilchrist
Secretary

May 16, 1975

Department of the Army
Rock Island District, Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Attention: Colonel Walter H. Johnson

Gentlemen:

Reference NCRED-PB

At your request the draft environmental statement (EIS) and the Interim Draft Feasibility Report for the proposed local flood protection project at West Des Moines-Des Moines, Iowa have been reviewed.

Based upon the proposed levee route, we have indicated on copies of Plate E-19 of the report areas where conflicts with existing Iowa Power gas mains and electric distribution and transmission facilities may occur. Because of the lack of detailed information available at this time concerning specific construction details along the levee route, it is impossible to state where conflicts with our facilities will actually occur. However, these areas marked on the enclosed drawings where the levee and our facilities are in close proximity should be considered as areas where relocation of gas or electric facilities may be required.

As detailed construction plans are developed, we will work with the Corps to determine the nature and extent of any required relocations of our gas and electric facilities. At this time it also will be possible to draw up any agreements necessary to accomplish these relcoations.

Sincerely,

Guy G. Gilchrist

Enclosures

WHEELER DIVISION

ST REGIS PAPER COMPANY

P.O. BOX 160, 1100 HOAK DRIVE
WEST DES MOINES, IOWA 50265
AREA 515 274-1584

May 16, 1975

U. S. Corps of Engineers
3440 North Division
Rock Island, Illinois 61201

Attention: Colonel Walter Johnson

Gentlemen:

The Wheeler Division - St. Regis Paper Company wants to go on record as protesting the Walnut Creek Flood Control Plan as outlined at the recent West Des Moines meeting.

We certainly feel that there are more logical opportunities to control these flood waters and therefore wish to advise that we vigorously oppose this present plan.

Yours truly,

WHEELER DIVISION

J. M. Hoak

J. M. Hoak
Divisional General Manager

JMH:GMW

W.H. JAMISON & CO., INC.
general contractors

May 6, 1975

Colonel Walter H. Johnson, District Engineer
Department of the Army
Rock Island District, Corps of Engineers
Rock Island, Illinois 61201

RE: NCRED-PB

Gentlemen:

I have reviewed the proposed levee construction particularly as it pertains to the west bank of Walnut Creek north of Ashworth Road.

In my opinion the proposed location will negate any chance of further development in this area and will ultimately reduce this area to worthless waste land. This area, due to its geographic location and its easy access to both east-west and north-south thoroughfares holds considerable promise for future development which would be of tremendous value to the city of West Des Moines as a source of tax revenue. This area is bounded on the east by Walnut Creek and on the West by the railroad tracks and this levee will not only prevent any further development on the east side of Hoak Drive, but will also reduce the property on the west side of the levee to a narrow sliver of land which will be of little or no value for future development. and would probably render it unusable for it's present stage of development.

As an alternative to the proposed plan I am of the opinion that further consideration should be given to improving the existing channel and relocating the proposed levee to the west bank of Walnut Creek. The channel improvement should permit considerable reduction in the levee height. We could then relocate Hoak Drive to the top of the levee and vacate the existing Hoak Drive. If the levee were not too high we property owners on the east side of Hoak Drive would have access to our property from the levee, and the property owners on the west side would be unaffected by this work.

Transfer of title of the vacated Hoak Drive to the property owners on the east side of Hoak Drive would reduce the right of way acquisition costs to some extent and would allow a major portion of this area to be developed to it's fullest potential.

Thank you for your consideration.

Very truly yours,

W. H. JAMISON & CO.

W. H. Jamison
President

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FINAL ENVIRONMENTAL STATEMENT

WEST DES MOINES AND DES MOINES, IOWA
DES MOINES RIVER BASIN
LOCAL FLOOD PROTECTION

APPENDIX B

LETTERS OF COMMENT RECEIVED ON THE REVISED DRAFT ENVIRONMENTAL STATEMENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII
1735 BALTIMORE
KANSAS CITY, MISSOURI 64108

October 14, 1976

Colonel Daniel L. Lycan, USA
District Engineer
Rock Island District
U.S. Army Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Lycan:

West Des Moines and Des Moines, Iowa
Local Flood Protection Project

We have reviewed the Revised Draft Environmental Statement for the project identified above. The project and statement have been rated LO-1. This rating means we have a lack of objections to the project as proposed and believe the statement provided an adequate appraisal of the proposed action.

The proposed project was reviewed by this agency and comments sent to your office on May 16, 1975. The additional information in the revised statement and your responses to our original comments provided sufficient data to alleviate our concerns with the project.

Thank you for the opportunity to review and comment on the revised draft statement. Please provide this office with one copy of the revised final statement when it is filed with the Council on Environmental Quality.

Sincerely yours,

Jerome H. Svore
Regional Administrator

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

PEP ER-76/823

DEC 15 1976

Dear General Morris:

This is in response to your August 16, 1976, letter requesting Department of the Interior's comments and recommendations on your proposed report and revised draft environmental impact statement on Des Moines River Basin, Iowa and Minnesota.

Chief of Engineers' Proposed Report

We have no substantive comments to offer on this report.

Revised Environmental Impact Statement

The approximate location of infiltration galleries for ground water collection should be shown on the maps or figures to indicate the relation to proposed structures or areas influenced by them. This would allow evaluation of the potential project impacts on the movement and quality of the ground-water resources. Existing or needed floodproofing for floodplain facilities related to the infiltration galleries should also be described. Sufficient information on the proposed pumping stations should be included to permit evaluation of the potential for impacts on ground water.

Contrary to the belief expressed in the Bureau of Mines May 16 memorandum, we now believe that the project may have a significant adverse impact on recovery of sand and gravel resources in the flood plain of the Raccoon River. A limited amount of sand and gravel would be lost under the proposed levees, and committed beneath proposed ponding areas if not recovered beforehand. We are more concerned, however, about the effect on active mineral operations and future recovery of available sand and gravel resources that remain in areas adjacent to project structures. The final locations selected for levee construction should consider the probable impact on these resources because fragmentation of sand and gravel deposits would hamper, and perhaps preclude, recovery of significant amounts of the resource.

Sand and gravel deposits in the project area are important because of their size and proximity to markets in the metropolitan area. We believe that every effort should be made to recover all available sand and gravel resources in the project area before the land is dedicated to other uses which would preclude its recovery.

Any analysis of project impacts on sand and gravel resources should include a discussion of the magnitude of the resource affected, and an assessment of the overall effect on the availability of sand and gravel resources in the Des Moines area.

We suggest that the effect of the project on sand and gravel resources and operations be described more precisely. For example, the sentence about mining in paragraph 2.032 should be recast to show that Polk County is the leading source of sand and gravel in Iowa and that a significant part of the production and available resources near the metropolitan area, are in the project area. The county is a leading cement-producing area in the State, and the Penn-Dixie Plant, which is adjacent to the project in West Des Moines, presumably would be among the beneficiaries of proposed improvements for flood control. Section IV, especially, should be expanded to describe all impacts of the proposed action on sand and gravel resources.

Paragraph 4.021 should be clarified to indicate that some volume of borrow material will be removed from a 44-acre area.

We believe that the glossary definition of Pleistocene is misleading and not in agreement with general usage. We recommend that the definition read "The time of most recent extensive glaciation, extending from about 1.5 - 2 million years ago up to the beginning of present (Holocene) time."

We appreciate the opportunity to comment on these documents.

Sincerely yours,

Stanley D. Doremus

Deputy Assistant Secretary of the Interior

J. W. Morris
Lieutenant General, USA
Chief of Engineers
Department of the Army
Washington, D. C. 20314

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D. C. 20250

11 November 1976

Lieutenant General J. W. Morris
Chief of Engineers
Office of the Chief of Engineers
Army Corps of Engineers
U. S. Department of the Army
Washington, D. C.

Dear General Morris:

This is in response to your letter of August 16, 1976, transmitting for our review and comments your report with pertinent papers and revised draft environmental impact statement on Des Moines River Basin, Iowa and Minnesota.

We are enclosing comments for your use in preparing the final report and environmental impact statement.

Sincerely,

ROBERT W. LONG
Assistant Secretary

Enclosure

U. S. Department of Agriculture
Comments on Report and Draft Environmental Impact Statement
Des Moines River Basin, Iowa and Minnesota

1. The section on resources and economy of the study area, pages 8-14, would benefit from clearer map delineation of the regions of the basin.

2. The correlation of tables F-7, F-10, and F-11 (pages F-21 and 25) are not clear. If table F-7 contains future growth values and additional flood plain development was not included (paragraph 41, page F-26), what is the nature of future benefits noted in paragraph 40, page F-25, and how were they used in the benefit analysis? Additional explanation in paragraph 40 would be helpful.

3. The discussion of recreation benefits on page F-31 would be strengthened by including the estimates of visitors per year and the value used per visitor day.

4. Environmental Impact Statement - On page 73 of the plan it is noted that one business and seven homes will be relocated as a result of the proposed project. The environmental impact statement does not list this as an impact.

5. The plan notes that 44 acres of agricultural land and 22 acres of forest land will be affected by the project. While these acreages are quite small, their relationship as to total acreage and quality of agricultural and forest land should be noted. The environmental impact statement should note this relationship to properly assess the impact.

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

MAILING ADDRESS:
U.S. COAST GUARD (G-WS/73)
WASHINGTON, D.C. 20590
PHONE: (202) 426-2262

12 November 1976

Lieutenant General J. W. Morris
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Morris:

This is in response to your letter of 16 August 1976 addressed to Secretary Coleman concerning a revised draft environmental impact statement on Des Moines River Basin, Iowa and Minnesota.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. The Coast Guard commented as follows:

> "Boater education and boating safety should have a place in the planning of recreational improvements in this project."

The Department of Transportation has no other comments to offer nor do we have any objections to this project. The final statement, however, should address the concerns of the Coast Guard.

The opportunity to review this draft statement is appreciated.

Sincerely,

D J Riley

D. J. RILEY
Captain, U. S. Coast Guard
Acting Chief, Office of Marine
Environment and Systems

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
OMAHA AREA OFFICE
UNIVAC BUILDING, 7100 WEST CENTER ROAD
OMAHA, NEBRASKA 68106

REGION VII
Room 300 Federal Office Building
911 Walnut Street
Kansas City, Missouri 64106

August 31, 1976

IN REPLY REFER TO:
7.2SS

Lieutenant General J. W. Morris
Chief of Engineers
Corps of Engineers
Washington, D. C. 20314

Dear General Morris:

I have reviewed the Draft Environmental Statement for Flood Protection in the Des Moines River Basin, and have found the document to be satisfactory in meeting the spirit and intent of the National Environmental Policy Act of 1969.

This determination was made on the basis of the following considerations: (1) HUD's areas of review responsibility in accordance with NEPA, and (2) HUD's activities in the Des Moines area that might be affected by the Environmental Statement.

Sincerely,

Stanley V. Quy
Environmental Clearance Officer

Office of the Governor
STATE CAPITOL
DES MOINES, IOWA 50319

ROBERT D RAY
GOVERNOR

November 4, 1976

Lieutenant General J. W. Morris
Chief of Engineers
Department of the Army
Washington, D. C. 20314

Dear General Morris:

Re: Feasibility Study for Flood Damage Reduction and Related Purposes, Des Moines River Basin, Iowa and Minnesota

The subject report and environmental impact statement transmitted to the State of Iowa, in accordance with the provisions of Public Laws 78-534, 85-624, and 91-190, have been distributed to members of our Inter-Agency Resource Council, which includes the Iowa Conservation Commission, the agency responsible for fish and wildlife, and to other interested agencies and individuals for comment. Further, interested persons have been given an opportunity to present their comments at a public hearing held by the Iowa Natural Resources Council on October 5, 1976, at West Des Moines, Iowa.

Based on response from the agencies and individuals to which the report and environmental statement were distributed and the evidence presented as a result of the October 5, 1976, public hearing, the following comments are submitted on behalf of the State of Iowa.

1. The function of providing flood protection to portions of the cities of Des Moines and West Des Moines is considered to be justifiable as a recognized hazard from flooding does exist in the area proposed for protection.

2. The project is responsive to water and related resource problems of flood prone areas of Des Moines and West Des Moines by providing a high degree of flood protection to existing industrial, commercial and residential development and incorporates provisions for recreation into the project design.

3. While the project as proposed is not incompatible with comprehensive water resource plans of a regional or river basin nature, said project does not necessarily relate to needs which may be associated with rural and urban runoff within the Raccoon River Basin.

4. To be assured of compatibility with state and local water resource interests, it is requested during post-authorization advanced engineering design:

   a. Consideration be given to investigating the feasibility of channel cleanout or other structural or nonstructural flood plain management techniques to minimize the increase in stage or else mitigate the effects of an increased stage along Jordan Creek in the vicinity of the Chicago, Rock Island and Pacific Railroad bridge.

   b. Reconsideration be given to nonstructural and structural flood plain management techniques along the reach of Walnut Creek in an effort to provide as much flood protection as possible to property owners not presently included in the protection of the proposed project, and that such reconsideration include the possibility of further improving the channel capacity and floodwater conveyance along Walnut Creek in the vicinity of Grand Avenue.

   c. Reconsideration be given to the location of the river access and boat ramp adjacent to the Raccoon River and 63rd Street, such that the best possible location is achieved.

5. Benefits to be derived from the proposed project will exceed costs.

6. Although most of the significant environmental effects have been studied, all possible related mitigation measures should again be reviewed during post-authorization advanced engineering design.

7. The impact on the Des Moines Water Works during the construction phase of the project needs to be addressed in the Environmental Impact Statement.

Subject to the preceding comments, I concur in the recommendations contained in the report and urge that the report be forwarded to Congress for consideration at the earliest possible date.

Sincerely,

Robert D. Ray
Governor

RDR:kjd (DJM - Fred)

COMMISSIONERS
JOHN G. LINK, Chairman–Burlington
THOMAS A. BATES–Bellevue
JOHN C. BROPHY–Lansing
CAROLYN T. LUMBARD–Des Moines
MARIAN PIKE–Whiting
HERBERT T. REED–Winterset
JOHN C. THOMPSON–Forest City

IOWA
CONSERVATION COMMISSION

FRED A. PRIEWERT, Director
300 Fourth Street, Des Moines, Iowa 50319
515/281-5145

An EQUAL OPPORTUNITY Agency

October 5, 1976

Colonel Daniel Lycan
District Engineer
Rock Island District,
Corps of Engineers
Clock Tower Building
Rock Island, Illinois 61201

Dear Colonel Lycan:

We have reviewed the Revised Draft EIS, West Des Moines-Des Moines Local Flood Protection Statement and would like to offer the following comments.

Because of the late date of receipt of these comments, we hope you will excuse the intradepartmental communication enclosed with our Statement. Most of the comments pertain to management of the completed project so would like to have you consider them in your final statement.

Thank you for an opportunity to review this Statement.

Sincerely,

Fred A. Priewert
Director

FAP:DH:rt

INTRADEPARTMENTAL COMMUNICATION

OCT 4 1

(PLEASE CONFINE TO ONE SUBJECT)

STATE CONSERVATION COMMISSION - DES MOINES , IOWA

TO Don Cummings DATE October 1, 1976

FROM Chuck Lebeda

SUBJECT : Revised Draft EIS, West Des Moines-Des Moines Local Flood Protection

Dear Don:

I have reviewed the EIS on the Flood protection afforded the cities of Des Moines and West Des Moines. There is not much further comment to be made that is not stated in the EIS. In regards to wildlife resources the following additional management practices should be suggested:

1. The removal of 22 acres of bottomland timber associations (8.02 Natural Resources 8.023, page 22) will represent a loss of mature woodland and woodland associated species; white-tailed deer, raccoon, opossum, squirrel, hawks, owls, woodpeckers, thrushes, warblers, etc. As stated it will be essentially be irretrievable, but as any opportunity exists extreme effect should be made possible to replace this specific environment whenever possible.

2. Loss of existing timber stands along the levee route from station 176+100 north will be affected as in (1(above and effort again should be made for habitat replacement.

3. As the levee will be seeded and construction areas seeded to herbaceous seedings as recommended by our Commission (Darrell Hayes, May 16, 1976); recommendations that grass stands that are established,not be mowed before August 1 of any growing season.are appropriate.

4. Extreme caution should be taken in snowmobile design to avoid bisecting remaining timber stands with snowmobile trails so as to allow wildlife species to move away from intense activity areas into areas of suitable escape cover.

5. Every effort possible be made to allow remaining timber to be unaffected by man's imposition and to remain as natural as possible.

6. The main trail system be restricted to atop the levee system.

Tom Putnam, fisheries biologist, felt " the proposed ramp sight is an ideal location for additional access to the Raccoon river. The proposed location adjoins 63rd street, and is easily accessible area for the public to reach. If the proposed ramp is construc it is mandatory that the shoreline adjacent to it, both upstream and downstream, be riprapped to ensure stabilization of the bank. Without the riprap, the ramp will continually silt in and be of little use to the public".

Concerning the meeting on the project October 5th, will comment be made by the ICC vocally or will a written statement be made?

Sincerely,

Chuck

cc. Putnam

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FINAL ENVIRONMENTAL STATEMENT

WEST DES MOINES AND DES MOINES, IOWA
DES MOINES RIVER BASIN
LOCAL FLOOD PROTECTION

APPENDIX C

GLOSSARY OF TERMS

GLOSSARY OF TERMS

AESTHETICS - Beauty - either natural, artificial, or implied

BIOSPHERE - That portion of the solid and liquid earth and its atmosphere where living organisms can be and are sustained

ECOSYSTEM - A community and its (living and nonliving) environment considered collectively

ECOTONE - The area of transition between two distinct ecosystems which features members of the communities of both

MICRO-CLIMATE - Conditions of moisture, temperature, etc., as influenced by topography, vegetation, and the like

PLEISTOCENE - The time of most recent extensive glaciation, extending about 1.5 - 2 million years ago-up-to-the-beginning of present (Holocene) time.

SPECIATION - Origin of species

TURBIDITY - A hazy or cloudy condition in water resulting from the presence of suspended silt or organic matter

FINAL ENVIRONMENTAL STATEMENT

WEST DES MOINES AND DES MOINES, IOWA
DES MOINES RIVER BASIN
LOCAL FLOOD PROTECTION

APPENDIX D

ECONOMIC DATA

ECONOMIC DATA EXTRACTED FROM U. S. ARMY CORPS OF ENGINEERS FEASIBILITY STUDY FOR FLOOD DAMAGE REDUCTION AND RELATED PURPOSES, DES MOINES RIVER BASIN, IOWA AND MINNESOTA

COMPLETE DOCUMENT IS AVAILABLE AT: U.S. ARMY ENGINEER DISTRICT,
ROCK ISLAND, ROCK ISLAND, ILLINOIS 61201

1. Following is a summary of cost estimates based on 1975 prices. Construction and relocations are to occur over a two year period.

ITEM	FEDERAL	NON-FEDERAL
Lands and Damages		$1,404,000
Relocation	$ 217,000	60,000
Levees and Floodwalls	2,160,000	
Closure Structures	634,000	
Ramps & Sandbag Closures	138,000	
Drainage Facilities	1,622,000	
Beautification	66,000	
Recreation Facilities	93,000	30,000
Engineering & Design	396,000	7,000
Supervision & Administration	297,000	5,000
TOTAL	$5,643,000	$1,506,000

2. Average annual damages based on 1975 conditions are $803,000. This figure is obtained by computing elevation-frequency relationships and combining this with elevation-damage data for various segments of the project.

3. Listed below are the annual charges for the project based on an interest rate of 6-1/8 percent and a project economic life of 100 years.

FEDERAL

First Cost	$5,643,000	
Interest During Construction (1/2 of 2 year construction period)	345,634	
TOTAL	$5,988,634	
Capital Recovery Factor	0.06141	
TOTAL Federal Annual Charge		$ 367,762

NON-FEDERAL

First Cost	$1,506,000	
Interest During Construction (1/2 of 2 year construction period)	92,242	
TOTAL	$1,598,242	
Capital Recovery Factor	0.06141	
Subtotal Non-Federal Annual Charge		$ 98,148
Levee Maintenance 4.8 miles at $500/mile	$ 2,400	
Pump Plant Energy and Demand AND Pump Plan Operation and Maintenance	15,150	
Replacements ($660,000) 1/	6,507	
Loss of Productivity	5,500	
TOTAL Non-Federal Annual Charges		$ 127,705

1/ Replacement pumps each 33.3 years during project life at a cost of $660,000.

4. Average Annual Benefits

TYPE	ANNUAL BENEFITS	PERCENT OF TOTAL
Recreation	$ 36,100	3.1
Industrial	151,100	12.9
Residential	352,400	30.1
Public	42,800	3.6
Land Enhancement	12,500	1.1
Commercial	574,000	49.2
TOTAL	$1,168,900	

5. Benefit/Cost Ratio and Net Benefits

Total annual monetary benefits for the Standard Project Flood level of protection are $1,168,900. Annual charges are $495,467 resulting in a B/C ratio of 2.36 and net benefits of $673,433.

Data for adverse effects upon habitat and the quality of the natural environment has not been included in the B/C ratio because of the difficulty of quantifying these costs. This also holds true for any beneficial effects upon the environment that would be brought about by the project.

FINAL ENVIRONMENTAL STATEMENT
WEST DES MOINES - DES MOINES, IOWA
LOCAL FLOOD PROTECTION
DES MOINES RIVER BASIN

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STATEMENT OF FINDINGS

West Des Moines - Des Moines, Iowa
Local Flood Protection
Des Moines River Basin

INTRODUCTION

I have reviewed and evaluated, in light of the overall public interest, the documents concerning the proposed local flood protection project and the various alternatives studied for the Des Moines River Basin. I have also evaluated the views of interested agencies and the concerned public in selecting the recommended plan of improvement.

BACKGROUND

The proposed project resulted from a study authorized by resolutions adopted on 10 July 1945 by the Committee on Commerce of the United States Senate and on 1 July 1958 by the Committee on Public Works of the House of Representatives, United States. Residents of the Des Moines River Basin requested a study to investigate flood damage reduction measures primarily in the upper basin to supplement the now completed Red Rock Dam and Lake Red Rock project on the Des Moines River and the completed local protection project at Des Moines, Iowa. An Interim Report prepared under authority of the 10 July 1945 resolution resulted in construction of the nearly completed Saylorville Lake and Saylorville Dam project on the Des Moines River. Several other studies and reports have been completed for the basin under other authorities.

Several public meetings have been held during the study period. In 1970 a series of public meetings was held to discuss six proposed projects:

Multipurpose Reservoir on the Raccoon River near Jefferson, Iowa

Multipurpose Reservoir on Walnut Creek near Des Moines, Iowa

Local Flood Protection Project at West Des Moines and Des Moines, Iowa

Local Flood Protection Project along Fourmile Creek at Des Moines, Iowa

Environmental Corridor on Des Moines River Downstream from Saylorville Dam

Environmental Corridor on Walnut Creek Downstream from Proposed Walnut Creek Dam and Reservoir

Following the 1970 public meetings five of the six proposed water resource projects were eliminated from further consideration by completion of separate studies and projects implemented as a result of them. Viable alternatives were reduced to only the West Des Moines and Des Moines Local Protection Project. The remaining plans were eliminated for the reasons summarized below.

DES MOINES, IOWA, FOURMILE CREEK - The City of Des Moines requested a separate study be made of this flood problem under a special small project authority available to the Corps of Engineers. A Detailed Project Report was prepared on this study. And, as a result, Fourmile Creek was no longer considered in the scope of this study.

DES MOINES RIVER ENVIRONMENTAL CORRIDOR - This is currently being considered as a modification to the Saylorville Lake Project and is being coordinated with the State of Iowa, Polk County, and the City of Des Moines.

WALNUT CREEK AND JEFFERSON RESERVOIRS - Local cooperating sponsors for both of these have indicated a lack of financial capability and/or interest in the recreation cost-sharing involved in the plans. The United States Environmental Protection Agency has indicated that allocation of storage for water quality in Jefferson Reservoir is unnecessary. As a result, further consideration has been discontinued.

WALNUT CREEK ENVIRONMENTAL CORRIDOR - The lack of interest in the reservoir also resulted in a lack of a local sponsor for the environmental corridor plan.

A late stage public meeting was held in May 1975 at West Des Moines to discuss the draft basin report which had been distributed throughout the area prior to the meeting. The selected plan received strong support from local officials and residents, and State and other Federal agencies. Statements, correspondence, and responses are included in the final report and EIS. The most significant opposition to the proposed plan centered on the proposed protection alignment along Walnut Creek near the upstream tie-off. The proposed alignment would exclude several properties from the protected area. Following a meeting with the property owners the District agreed to review the proposed alignment during post-authorization studies.

THE SELECTED PLAN

The selected plan consists of about five miles of new and improved earth levees, including 600 feet of floodwall along Jordan Creek, Raccoon River, and Walnut Creek in the communities of West Des Moines and Des Moines, Iowa. The proposed project would protect about 927 acres including 922 homes, 143 businesses, and 22 industries from the Standard Project Flood. The selected plan includes raising four street and one railroad, eight gate closure structures, four storm water ponding areas, three storm water pumping stations, and several gravity outlet structures. The plan includes recreational facilities to be cost-shared by the U.S. Government and the local communities. Facilities include bicycle baths, fishing piers, a boat ramp, and a small park. The plan also includes installation of flood warning systems on Jordan Creek and Walnut Creek. A 44-acre borrow site located 2.5 miles west of the project area was selected by local officials. Proposed beautification features include seeding and landscaping of the levees and ponding areas.

ALTERNATIVES

No Additional Action. This alternative plan for flood damage reduction would consist of existing and proposed flood plain regulations, flood insurance, flood forecasting and a warning system of National Weather Service, and emergency flood fighting and evacuation measures.

Flood plain regulations would prevent future flood damages by prohibiting construction of flood vulnerable structures. Existing structures in floodways could be evacuated over the long-term. However, an estimated $803,000 in average annual flood damages would continue for existing development in the flood fringe areas. Flood insurance would provide reimbursement to inhabitants of the flood plain but the cost of flood damages to the Nation would increase because of the administration costs of the program. Flood warning and forecasting may prevent loss of life during flood periods; but the economic, health, and associated costs of flooding will remain. The "no additional action" plan would not effectively reduce flood damages to public health and safety.

Non-Structural. Total permanent evacuation of the flood plain and partial evacuation combined with flood proofing of selected structures were evaluated and found to be economically, socially, and environmentally infeasible as a solution for flood damage in the study area. The adverse impacts of evacuating or flood proofing over 1,100 homes and businesses would make such a plan infeasible.

STRUCTURAL

Levee and Floodwall. In addition to the selected plan, levee alignment modifications were considered along the right bank of Walnut Creek upstream of Grand Avenue. Structural protection was also considered for urban developments along the left bank of

Walnut Creek at Grand Avenue and along the right bank of Jordan Creek downstream of Fuller Road.

Alignment 1-B would have placed the line of protection on the east side of 63rd Street. No additional development would be protected and the proximity to Walnut Creek would cause rises in the 100-year flood exceeding one foot. In addition, the cost of one additional closure structure and channel modifications necessary to accommodate a reach of floodwall makes this alignment significantly more costly than the alignment on the west side of 63rd Street which is in the selected plan.

Alignment 1-C considered raising a portion of Hoak Drive 9-10 feet and including it as part of the line of protection which would be extended to the I-235 embankment. Two additional developments along Center Street would be protected. The additional cost of this alignment is greater than the flood damage reduction benefits received and access to three businesses would be seriously impeded.

Alignment 1-D examined the feasibility of providing protection to a cement plant south of Center Street. The close proximity of the plant to Hoak Drive and Center Street and the access requirements of truck traffic make the cost of floodwalls and several closure structures greater than the benefits received.

Alignment 1-E would extend protection to three businesses on the east side of Hoak Drive and to a house and business along Center Street. Encroachment into the floodway by this alignment would increase 100-year flood heights in a residential area on the opposite bank by more than 2.0 feet making mitigative measures necessary for that area. Protection of the residential area could be accomplished by construction of a levee there or by channelization of a short reach of Walnut Creek to increase capacity and velocity. Neither mitigative levee construction nor channelization required to accompany this alternative would be economically feasible. The benefit-to-cost ratio of alignment 1-E and levee construction on the opposite bank is 0.8:1. The benefit-to-cost ratio of 1-E and channelization is 0.4:1. In addition, both mitigative measures would destroy lowland woods and disrupt aesthetics of the stream.

Alignment 2 would increase the protected area to include seven additional businesses and four residences by construction of levees along the left bank of Walnut Creek in the vicinity of Grand Avenue. Cost of this plan is $910,000 excluding rights-of-way. Annual damage reduction benefits are $26,400 resulting in an unacceptable benefit-to-cost ratio of 0.5:1.

Alignment 3 would expand the protected area by construction of levees along the right bank of Jordan Creek and the left bank of the Raccoon River. Several industries located in an industrial park would receive flood protection. Cost of this alignment is $500,000 excluding rights-of-way and drainage facilities. Annual benefits are $500 and the resulting benefit-to-cost ratio is only 0.02:1. Environmental effects of this alignment would be loss of lowland woods and agricultural land.

Several comments were received during the late stage of the study by property owners along Hoak Drive who would be excluded from the selected plan. The proposed plan along Walnut Creek upstream of Grand Avenue would be reviewed during postauthorization studies to consider the concerns expressed by these property owners.

Reservoirs. Upstream multipurpose reservoirs were considered on the Raccoon River and Walnut Creek. Reservoirs were found to be infeasible on the basis of flood damage reduction benefits alone. Local interests were either financially unable or did not wish to participate in a cost-sharing recreation plan for reservoirs on either stream. The United States Environmental Protection Agency (EPA) has determined that allocation of reservoir storage at Raccoon River sites is unnecessary for water quality control. The reservoir studies also revealed that because of the large uncontrolled drainage area between the reservoir sites and the West Des Moines area that other flood damage reduction measures would be required in conjunction with upstream reservoirs. Flood stages could not be reduced sufficiently to eliminate flood damages with reservoirs only.

Channel and Bridge Modifications to reduce flood damages in the study area were found to be economically and environmentally infeasible. The higher financial cost, the adverse effects on the natural resources for wildlife habitat and recreation, and the possible adverse impacts on the infiltration gallery water supply system for the city of Des Moines located along the Raccoon River would preclude widening and straightening channels to reduce levee or floodwall heights.

EVALUATION

The following considerations were pertinent in evaluating the selected plan.

Environmental

Environmental considerations included avoiding adverse impacts wherever possible and providing mitigation for adverse impacts which could not be avoided. Approximately 22 acres of flood plain vegetation of value as wildlife habitat will be destroyed. After construction, landscaping and reestablishment of vegetation would help mitigate the impact on wildlife. The major borrow site will disturb 44 acres presently in agriculture. This land will be returned to a condition suitable for agriculture or other use as determined locally. The project is planned to be compatible with existing recreation uses and coordination is continuing with local interests to develop a plan to enhance recreation opportunities in conjunction with the project. No archaeological or historical resources of the area would be adversely affected by the project. A secondary effect of providing increased flood protection could be acceleration of development with resulting changes in land use and loss of existing vegetation. Local governments presently have the necessary legal means to insure that natural areas are protected while allowing for appropriate growth.

Social Well-Being

The proposed plan would protect some 927 acres of flood fringe area including 922 homes, 143 businesses, and 22 industries. The health, safety, and well-being of the residents of the protected area would be improved over existing conditions during periods of flooding. Anxieties associated with potential flood and emotional stress induced by flooding would be eliminated within the protected area. The relocation of one business and seven homes would be required by the proposed plan. Transportation services and facilities would no longer be interrupted by flooding. The recreational opportunities which will result from the plan will also benefit the residents of the area. Flood flows greater than the design flood flow for each stream could potentially overtop the proposed line of protection. Such a flood event would be extremely rare, however. Unprotected areas will continue to suffer flood damages. Residents of these areas may feel alienated by the proposed action.

Engineering

Earthen levees are proposed, where land is available, to avoid the high cost of floodwall construction. Floodwalls will be either poured concrete I-wall or precast concrete. Freeboard of at least three feet will be provided to prevent overtopping by wave wash and to provide allowance for other hydraulic uncertainties with respect to large floods.

Levee alignments are compatible with preliminary encroachment limits along streams. Future planning of the project will take into account the floodway limits that will be established by the local communities. The specific project effects on flood stages have been reviewed and approved by the Iowa Natural Resources Council.

Economic

Economic optimization of the selected plan was calculated considering the level of flood protection which provides the greatest flood reduction benefits compared to the cost of construction, operation, and maintenance of the project. The studies indicated that flood protection to a level of the 200-year-frequency flood would provide the maximum net benefits. The Standard Project Flood level of protection is recommended, however, to increase the safety and well-being of the residents of the protected flood plain.

The estimated Federal first cost of construction is $5,643,000 and the estimated non-Federal first cost is $1,506,000; these total $7,149,000. The Federal average annual cost calculated at 6-1/8 percent interest is $367,800, and the non-Federal average annual cost is $127.700, these total $495,467. The estimated average annual benefits corresponding to the design level of protection are $815,700 for existing conditions; and $1,168,900 for conditions including an increase to the base year, future growth, and land enhancement. The benefit-to-cost ratio for existing conditions is 1.65, and the benefit-to-cost ratio including future growth and land enhancement is 2.36.

CONCLUSION

I find that the selected plan is based on a thorough analysis and evaluation of alternatives. Adverse effects are avoided where possible, and where not possible are mitigated by contrasting beneficial effects. The plan satisfies the goal of finding a socially acceptable and economically and environmentally justified project to solve the flood problems in the Des Moines River Basin.

It is my decision to recommend implementation of the project for West Des Moines and Des Moines, Iowa, along the Raccoon River, Walnut Creek, and Jordan Creek.

29 Jan 1976
(date)

DANIEL L. LYCAN
Colonel, Corps of Engineers
District Engineer

STATEMENT OF FINDINGS

West Des Moines - Des Moines, Iowa
Local Flood Protection
Des Moines River Basin

I concur with the preceding Statement of Findings.

9 Feb 76
(Date)

ROBERT L. MOORE
Brigadier General, USA
Division Engineer

I concur with the preceding Statement of Findings.

17 July 1977
(Date)

DRAKE WILSON
Brigadier General, USA
Deputy Director of Civil Works

JUN 14 1979

96th Congress, 1st Session - - - - - - - House Document No. 96-147

CUMULATIVE REPORT ON RESCISSIONS AND DEFERRALS, JUNE 1979

COMMUNICATION

FROM

THE DIRECTOR, OFFICE OF MANAGEMENT AND BUDGET, EXECUTIVE OFFICE OF THE PRESIDENT

TRANSMITTING

A CUMULATIVE REPORT ON RESCISSIONS AND DEFERRALS OF BUDGET AUTHORITY AS OF JUNE 1, 1979, PURSUANT TO SECTION 1014(e) OF PUBLIC LAW 93-344

JUNE 11, 1979.—Referred to the Committee on Appropriations and ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE
39-012 O WASHINGTON : 1979

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EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

June 8, 1979

Honorable Thomas P. O'Neill
Speaker of the House of
Representatives
Washington, D.C. 20515

Dear Mr. Speaker:

In accordance with Executive Order 11845, I am transmitting the cumulative report required by Section 1014(e) of the Congressional Budget and Impoundment Control Act of 1974. In accordance with that Act, the report is also being transmitted to the Senate and will be published in the Federal Register.

Sincerely,

Jim McIntyre

James T. McIntyre, Jr.
Director

RECEIVED
1979 JUN 11 PM 2 02
U.S. H[illegible] REPRESENTATIVES

Enclosures

IDENTICAL LETTER SENT TO THE PRESIDENT OF THE SENATE.

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CUMULATIVE REPORT ON
RESCISSIONS AND DEFERRALS
June 1979

This report is submitted in fulfillment of the requirements of Section 1014(e) of the Impoundment Control Act of 1974 (Public Law 93-344). Section 1014(e) provides for a monthly report listing all budget authority for this fiscal year with respect to which, as of the first day of the month, a special message has been transmitted to the Congress.

This month's report gives the status as of June 1, 1979, of 11 rescissions and 57 deferrals contained in the first nine special messages of FY 1979. These messages were transmitted to the Congress on October 2, November 30, December 7, December 12, 1978, January 31, February 14, March 15, April 4, and April 26, 1979.

Rescissions (Table A and Attachment A)

Congressional action has been completed on all FY 1979 rescission proposals. Table A summarizes the status of rescissions proposed by the President as of June 1, 1979, while Attachment A shows the history and status of each rescission proposed during FY 1979.

Deferrals (Table B and Attachment B)

As of June 1, 1979, $2,768.0 million in 1979 budget authority was being deferred from obligation and another $2.4 million in 1979 obligations was being deferred from expenditure. Table B summarizes the status of deferrals reported by the President, and Attachment B shows the history and status of each deferral reported during FY 1979.

Information from Special Messages

The special messages containing information on each of the rescissions and deferrals covered by the cumulative report are contained in the Federal Registers of:

Wednesday, October 11, 1978 (Vol. 43, No. 197, Part III)
Wednesday, December 6, 1978 (Vol. 43, No. 235, Part III)
Wednesday, December 13, 1978 (Vol. 43, No. 240, Part VI)
Monday, December 18, 1978 (Vol. 43, No. 243, Part VI)
Monday, February 5, 1979 (Vol. 44, No. 25, Part VI)
Wednesday, February 21, 1979 (Vol. 44, No. 36, Part VII)
Tuesday, March 20, 1979 (Vol. 44, No. 55, Part VIII)
Monday, April 9, 1979 (Vol. 44, No. 69, Part VI)
Tuesday, May 1, 1979 (Vol. 44, No. 85, Part V)

Attachments

Table A

STATUS OF 1979 RESCISSION PROPOSALS

	Amount (in millions of dollars)
Rescissions proposed by the President.......................	$908.7 a/
Accepted by the Congress..................................	-723.6 b/
Rejected by the Congress..................................	-185.1 c/
Pending before the Congress................................	-0-

* *

Table B

STATUS OF 1979 DEFERRALS

	Amount (in millions of dollars)
Deferrals proposed by the President.........................	$ 4,373.8
Routine Executive releases (-$1,588.9 million) and adjustments (-$7.8 million) through June 1, 1979*....	-1,596.8
Overturned by the Congress................................	-6.6
Currently before the Congress..............................	$ 2,770.4 d/

---

a/ This amount is net of a $6.0 million reduction proposed in a Small Business Administration rescission (R79-11A).

b/ Public Law 96-7.

c/ Of this amount, $51.0 million is presently deferred (D79-55 and D79-29A).

d/ This amount includes $2.4 million in outlays for a Department of the Treasury deferral (D79-25B).

* Detail does not add to total due to rounding.

PAGE 1 ATTACHMENT A - STATUS OF RESCISSIONS - FISCAL YEAR 1979 AS OF 08/04/79 14:30

AS OF JUNE 1, 1979 AMOUNTS IN THOUSANDS OF DOLLARS AGENCY/BUREAU/ACCOUNT	RESCISSION NUMBER	AMOUNT PREVIOUSLY CONSIDERED BY CONGRESS	AMOUNT CURRENTLY BEFORE THE CONGRESS	DATE OF MESSAGE MO DA YR	AMOUNT RESCINDED	AMOUNT MADE AVAILABLE	DATE MADE AVAILABLE MO DA YR
DEPARTMENT OF ENERGY							
Energy Programs							
Fossil energy construction BA	R79- 2	50,000a		1 31 79			
DEPARTMENT OF ENERGY TOTAL BA		50,000					
DEPARTMENT OF HEALTH, EDUCATION AND WELFARE							
National Institutes of Health							
Buildings and facilities BA	R79- 3	37,000		1 31 79	37,000b		
Health Resources Administration							
Health resources BA	R79- 4	167,893		1 31 79	46,350b	121,543	3 26 79
Office of Education							
Special projects and training BA	R79- 5	22,365		1 31 79	12,500b	9,865	3 26 79
DEPARTMENT OF HEALTH, EDUCATION AND WELFARE TOTAL BA		227,258			95,850	131,408	
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT							
Housing Programs							
Subsidized housing programs BA							

ATTACHMENT A - STATUS OF RESCISSIONS - FISCAL YEAR 1979

AS OF 06/04/79 14:30

AS OF JUNE 1, 1979 AMOUNTS IN THOUSANDS OF DOLLARS AGENCY/BUREAU/ACCOUNT	RESCISSION NUMBER	AMOUNT PREVIOUSLY CONSIDERED BY CONGRESS	AMOUNT CURRENTLY BEFORE THE CONGRESS	DATE OF MESSAGE MO DA YR	AMOUNT RESCINDED	AMOUNT MADE AVAILABLE	DATE MADE AVAILABLE MO DA YR
	R79- 6	600,000		1 31 79	600,000b		
New Communities Development Corporation							
New community assistance grants BA	R79- 7	8,167		1 31 79	8,167b		
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT TOTAL BA		608,167			608,167		
DEPARTMENT OF THE INTERIOR							
Bureau of Mines							
Helium fund BA	R79- 8	3,127		1 31 79	3,127b		
DEPARTMENT OF THE INTERIOR TOTAL BA		3,127			3,127		
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION							
Research and program management BA	R79- 9	2,400		1 31 79	2,400b		
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION TOTAL BA		2,400			2,400		
OTHER INDEPENDENT AGENCIES							
Foreign Claims Settlement Commission							

PAGE 3 ATTACHMENT A - STATUS OF RESCISSIONS - FISCAL YEAR 1979 AS OF 06/04/79 14:30

AS OF JUNE 1, 1979 AMOUNTS IN THOUSANDS OF DOLLARS AGENCY/BUREAU/ACCOUNT		RESCISSION NUMBER	AMOUNT PREVIOUSLY CONSIDERED BY CONGRESS	AMOUNT CURRENTLY BEFORE THE CONGRESS	DATE OF MESSAGE MO DA YR	AMOUNT RESCINDED	AMOUNT MADE AVAILABLE	DATE MADE AVAILABLE MO DA YR
Payment of Vietnam prisoner of war claims	BA	R79-10	9,000c		1 31 79	8,000b	d	
Salaries and expenses	BA	R79- 1	75		11 30 78		75	3 13 79
Small Business Administration								
Salaries and expenses	BA	R79-11	14,665		1 31 79			
	BA	R79-11A	-6,000		3 15 79	6,065b	2,600	3 26 79
OTHER INDEPENDENT AGENCIES TOTAL BA			17,740			14,065	2,675	
TOTAL BA			908,692			723,609	134,083e	

FOOTNOTES

a. These funds are included in a deferral (D79-55) transmitted to the Congress on April 26, 1979.

b. Public Law 96-7.

c. This amount was initially deferred (D79-29) in a special message transmitted to the Congress on October 2, 1978.

d. $1.0 million of the $9.0 million proposed for rescission is included in a deferral (D79-29A) transmitted to the Congress on April 26, 1979.

e. In addition to these amounts, rescissions totalling $51.0 million were rejected by the Congress, but are now included in deferrals D79-55 and D79-29A (as indicated under footnotes a and d).

END OF REPORT

PAGE 1 ATTACHMENT B - STATUS OF DEFERRALS - FISCAL YEAR 1979 AS OF 06/01/79 14:16

AMOUNTS IN THOUSANDS OF DOLLARS AGENCY/BUREAU/ACCOUNT		DEFERRAL NUMBER	AMOUNT TRANSMITTED ORIGINAL REQUEST	AMOUNT TRANSMITTED SUBSEQUENT CHANGE	DATE OF MESSAGE MO DA YR	CUMULATIVE OMB /AGENCY RELEASES	CONGRESSIONALLY REQUIRED RELEASES	CUMULATIVE ADJUSTMENTS	AMOUNT DEFERRED AS OF 06-01-79
FUNDS APPROPRIATED TO THE PRESIDENT									
International Security Assistance									
Military assistance	BA	D79-31	161,875		11 30 78	-161,875a			
International military education and training	BA	D79-35	24,312		12 7 78	-24,312a			
Foreign military credit sales	BA	D79-45	651,000		12 12 78	-601,690			49,310
FUNDS APPROPRIATED TO THE PRESIDENT TOTAL	BA		837,187			-787,877			49,310
DEPARTMENT OF AGRICULTURE									
Foreign Agricultural Service									
Salaries & expenses (special foreign currency)	BA	D79- 1	415		10 2 78	-13			402
Agricultural Stabilization & Conservation Service									
Commodity credit corporation	BA	D79- 2	3,530		10 2 78				
	BA	D79- 2A			12 7 78	-3,530			
Forest Service									
Acquisition of lands for Wasatch National Forest	BA	D79-36	209		12 7 78				209
Timber salvage sales	BA	D79-37	5,500		12 7 78	-702			4,798
Expenses, brush disposal	BA	D79- 3	32,225		10 2 78				37,501
	BA	D79- 3A		5,276	1 31 79				

ATTACHMENT B - STATUS OF DEFERRALS - FISCAL YEAR 1979

AMOUNTS IN THOUSANDS OF DOLLARS AGENCY/BUREAU/ACCOUNT		DEFERRAL NUMBER	AMOUNT TRANSMITTED ORIGINAL REQUEST	AMOUNT TRANSMITTED SUBSEQUENT CHANGE	DATE OF MESSAGE MO DA YR	CUMULATIVE OMB /AGENCY RELEASES	CONGRESSIONALLY REQUIRED RELEASES	CUMULATIVE ADJUSTMENTS	AMOUNT DEFERRED AS OF 06-01-79
Restoration of forest lands	BA	D79- 4	48		10 2 78				48
DEPARTMENT OF AGRICULTURE TOTAL	BA		41,927	5,276		-4,245			42,958
DEPARTMENT OF COMMERCE									
National Oceanic and Atmospheric Administration									
Operations, research, and facilities	BA	D79-47	500		1 31 79				500
Construction	BA	D79- 5	9,830		10 2 78				
	BA	D79- 5A		202	12 12 78	-10,032			
Promote and develop fishery products and research	BA	D79- 6	12,060		10 2 78	-5,481	-6,579b		
Fisheries loan fund	BA	D79- 7	5,429		10 2 78				
	BA	D79- 7A		208	1 31 79				5,637
United States Fire Administration									
Facilities	BA	D79-32	6,150		11 30 78	-6,150			
Maritime Administration									
Ship construction	BA	D79-33	157,000		11 30 78	-134,000			23,000
DEPARTMENT OF COMMERCE TOTAL	BA		190,969	410		-155,663	-6,579		29,137
DEPARTMENT OF DEFENSE-MILITARY									
Procurement									
Shipbuilding and conversion, Navy	BA	D79-34	563,940		11 30 78				563,940

AMOUNTS IN THOUSANDS OF DOLLARS AGENCY/BUREAU/ACCOUNT	DEFERRAL NUMBER	AMOUNT TRANSMITTED ORIGINAL REQUEST	AMOUNT TRANSMITTED SUBSEQUENT CHANGE	DATE OF MESSAGE MO DA YR	CUMULATIVE OMB /AGENCY RELEASES	CONGRESSIONALLY REQUIRED RELEASES	CUMULATIVE ADJUSTMENTS	AMOUNT DEFERRED AS OF 06-01-79
Research, Development, Test, and Evaluation								
Navy								
BA	D79-53	107,964		4 4 79	-107,964a			
Military Construction								
Military construction, all services								
BA	D79- 8	548,451		10 2 78	-467,592		374	81,233
DEPARTMENT OF DEFENSE-MILITARY TOTAL BA		1,220,355			-575,556		374	645,173
DEPARTMENT OF DEFENSE-CIVIL								
Corps of Engineers								
Alaska hydroelectric power development fund								
BA	D79-10	5,450		10 2 78				5,450
Wildlife Conservation, Military Reservations								
Wildlife conservation, all services								
BA	D79- 9	458		10 2 78				
BA	D79- 9A		130	1 31 79	-38			550
DEPARTMENT OF DEFENSE-CIVIL TOTAL BA		5,908	130		-38			6,000
DEPARTMENT OF ENERGY								
Energy Programs								
Fossil energy construction								
BA	D79-55	50,000c		4 26 79				50,000
BA	D79-56	570		4 26 79				570
Strategic Petroleum Reserve								
BA	D79-57	113,528		4 26 79				113,528
Uranium enrichment - operating expenses								
BA	D79-48	63,000		1 31 79				63,000

PAGE 4 ATTACHMENT B - STATUS OF DEFERRALS - FISCAL YEAR 1979 AS OF 06/01/79 14:16

AMOUNTS IN THOUSANDS OF DOLLARS AGENCY/BUREAU/ACCOUNT	DEFERRAL NUMBER	AMOUNT TRANSMITTED ORIGINAL REQUEST	AMOUNT TRANSMITTED SUBSEQUENT CHANGE	DATE OF MESSAGE MO DA YR	CUMULATIVE OMB /AGENCY RELEASES	CONGRESSIONALLY REQUIRED RELEASES	CUMULATIVE ADJUSTMENTS	AMOUNT DEFERRED AS OF 06-01-79
DEPARTMENT OF ENERGY								
TOTAL BA		227.098						227.098
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE								
Alcohol, Drug Abuse & Mental Health Administration								
Construction & renovation, St. Elizabeths Hospital	BA D79-11	27,577		10 2 78				27.577
Social Security Administration								
Limitation on salaries and expenses	BA D79-12	1,725		10 2 78				1,725
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE								
TOTAL BA		29.302						29.302
DEPARTMENT OF THE INTERIOR								
Bureau of Land Management								
Oregon and California grant lands	BA D79-46	12,811		12 12 78				
	BA D79-46A		1,901	1 31 79				14,712
Heritage Conservation and Recreation Service								
Land and water conservation fund	BA D79-13	30.000		10 2 78				30.000
Geological Survey								
Exploration of National Petroleum Res. in Alaska	BA D79-54	1,792		4 4 79				1,792
Payments from proceeds, sale of water	BA D79-14	36		10 2 78				36
Bureau of Mines								

AMOUNTS IN THOUSANDS OF DOLLARS AGENCY/BUREAU/ACCOUNT		DEFERRAL NUMBER	AMOUNT TRANSMITTED ORIGINAL REQUEST	AMOUNT TRANSMITTED SUBSEQUENT CHANGE	DATE OF MESSAGE MO DA YR	CUMULATIVE OMB /AGENCY RELEASES	CONGRESSIONALLY REQUIRED RELEASES	CUMULATIVE ADJUSTMENTS	AMOUNT DEFERRED AS OF 06-01-79
Drainage of anthracite mines	BA	D79-15	1,700		10 2 78	-363			1,337
Office of Territorial Affairs									
Administration of territories	BA	D79-30	25,000		12 7 78	-25,000			-
Trust territory of the Pacific Islands	BA	D79-16	12,000		10 2 78	-12,000			
DEPARTMENT OF THE INTERIOR TOTAL	BA		83,339	1,901		-37,363			47,877
DEPARTMENT OF JUSTICE									
Legal Activities									
Salaries and expenses, Community Relations Service	BA	D79-49	572		1 31 79				572
Federal Prison System									
Buildings and facilities	BA	D79-17	25,300		10 2 78				
	BA	D79-17A		11,865	11 30 78	-160			37,005
DEPARTMENT OF JUSTICE TOTAL	BA		25,872	11,865		-160			37,577
DEPARTMENT OF LABOR									
Employment and Training Administration									
Employment and training assistance	BA	D79-50	122,133		1 31 79				122,133
DEPARTMENT OF LABOR TOTAL	BA		122,133			-			122,133

AMOUNTS IN THOUSANDS OF DOLLARS AGENCY/BUREAU/ACCOUNT	DEFERRAL NUMBER	AMOUNT TRANSMITTED ORIGINAL REQUEST	AMOUNT TRANSMITTED SUBSEQUENT CHANGE	DATE OF MESSAGE MO DA YR	CUMULATIVE OMB /AGENCY RELEASES	CONGRESSIONALLY REQUIRED RELEASES	CUMULATIVE ADJUSTMENTS	AMOUNT DEFERRED AS OF 06-01-79
DEPARTMENT OF STATE								
Administration of Foreign Affairs								
Acquisition, operation, & maintenance of buildings								
BA	D79-39	36,787		12 7 78				36,787
Other								
Emergency refugee and migration assistance fund								
BA	D79-18	2,750		10 2 78				
BA	D79-18A		9,500	11 30 78	-12,250			
DEPARTMENT OF STATE TOTAL BA		39,537	9,500		-12,250			36,787
DEPARTMENT OF TRANSPORTATION								
Federal Aviation Administration								
Civil supersonic aircraft development termination								
BA	D79-19	3		10 2 78				3
Facilities & equip. (Airport & airway trust fund)								
BA	D79-20	290,176		10 2 78				
BA	D79-20A		21,259	1 31 79				311,435
Federal Highway Administration								
Trust fund share of other highway programs								
BA	D79-21	40,000		10 2 78				
BA	D79-21A		14,169d	2 14 79				54,169
Overseas highway								
BA	D79-22	13,100		10 2 78				13,100
Urban Mass Transportation Administration								
Urban mass transportation fund								
BA	D79-51	968,616		1 31 79				968,616
DEPARTMENT OF TRANSPORTATION TOTAL BA		1,311,895	35,428					1,347,323

PAGE 7 ATTACHMENT B - STATUS OF DEFERRALS - FISCAL YEAR 1979 AS OF 06/01/79 14:16

AMOUNTS IN THOUSANDS OF DOLLARS AGENCY/BUREAU/ACCOUNT		DEFERRAL NUMBER	AMOUNT TRANSMITTED ORIGINAL REQUEST	AMOUNT TRANSMITTED SUBSEQUENT CHANGE	DATE OF MESSAGE MO DA YR	CUMULA-TIVE OMB /AGENCY RELEASES	CONGRES-SIONALLY REQUIRED RELEASES	CUMULA-TIVE ADJUST-MENTS	AMOUNT DEFERRED AS OF 06-01-79
DEPARTMENT OF THE TREASURY									
Office of the Secretary									
Antirecession financial assistance fund									
	BA	D79-23	2,205		10 2 78				
	BA	D79-23A		73	12 7 78	-50			2,228
	O	D79-40	5		12 7 78				
	O	D79-40A		3	1 31 79	-8			
State and local government fiscal assistance fund									
	BA	D79-24	78,489		10 2 78				
	BA	D79-24A		1,665	12 7 78	-530			79,624
	O	D79-25	2,404		10 7 78				
	O	D79-25A		1,562	12 7 78				
	O	D79-25B		11,835e	2 14 79	-14,154		785	2,432
Bureau of the Mint									
Construction of mint facilities									
	BA	D79-26	5,730		10 2 78				5,730
DEPARTMENT OF THE TREASURY									
TOTAL BA			86,424	1,738		-580			87,582
TOTAL O			2,409	13,400		-14,162		785	2,432
GENERAL SERVICES ADMINISTRATION									
Property Management and Disposal Activities									
Rare silver dollar program									
	BA	D79-27	2,123		10 2 78				2,123
Federal Preparedness Agency									
State and local preparedness									
	BA	D79-28	80		10 2 78				80
GENERAL SERVICES ADMINISTRATION									
TOTAL BA			2,203						2,203

PAGE 8 ATTACHMENT B - STATUS OF DEFERRALS - FISCAL YEAR 1979 AS OF 08/01/79 14:16

AMOUNTS IN THOUSANDS OF DOLLARS AGENCY/BUREAU/ACCOUNT		DEFERRAL NUMBER	AMOUNT TRANSMITTED ORIGINAL REQUEST	AMOUNT TRANSMITTED SUBSEQUENT CHANGE	DATE OF MESSAGE MO DA YR	CUMULA-TIVE OMB /AGENCY RELEASES	CONGRES-SIONALLY REQUIRED RELEASES	CUMULA-TIVE ADJUST-MENTS	AMOUNT DEFERRED AS OF 08-01-79
OTHER INDEPENDENT AGENCIES									
Foreign Claims Settlement Commission									
Payment of Vietnam prisoner of war claims	BA	D79-29	10,945		10 2 78				
	BA	D79-29A		1,000	4 26 79	-1,051		-9,000f	1,894
International Communication Agency									
Salaries & expenses	BA	D79-41	2,095		12 7 78				2,095
Acquisition & construction of radio facilities	BA	D79-42	3,141		12 7 78				
	BA	D79-42A		7,832	2 14 79				10,973
Interstate Commerce Commission									
Payments for directed rail service	BA	D79-30	13,990		10 2 78				13,990
Small Business Administration									
White House conference on small business	BA	D79-43	1,600		12 7 78				1,600
Navaho & Hopi Indian Relocation Commission									
Salaries and expenses	BA	D79-44	12,000		12 7 78				12,000
Tennessee Valley Authority									
Tennessee Valley Authority fund	BA	D79-52	15,000		1 31 79				15,000
OTHER INDEPENDENT AGENCIES TOTAL BA			58,771	8,832		-1,051		-9,000	57,552
TOTAL BA			4,282,920	75,080		-1,574,783	-6,579	-8,626	2,768,012
TOTAL D			2,409	13,400		-14,182		785	2,432

FOOTNOTES

a. This amount was released before the special message containing the deferral was transmitted to Congress.

b. Impoundment resolution S. Res. 50 passed the Senate on March 13, 1979, rejecting this deferral.

c. This amount was included in a rescission proposal (R79-2) transmitted to the Congress on January 31, 1979.

d. This amount is net of a release of $10,831 thousand that was made prior to the transmittal of this supplementary report.

e. This amount is net of a release of $2,857 thousand that was made prior to the transmittal of this supplementary report.

f. This amount was included in a rescission proposal (R79-10) transmitted to the Congress on January 31, 1979.

END OF REPORT

96th Congress, 1st Session - - - - - - - - - House Document No. 96-148

NATIONAL HEALTH PLAN

MESSAGE

FROM

THE PRESIDENT OF THE UNITED STATES

TRANSMITTING

HIS PROPOSAL FOR A NATIONAL HEALTH INSURANCE PROGRAM

JUNE 12, 1979.—Message and accompanying papers referred to the Committees on Interstate and Foreign Commerce and Ways and Means and ordered to be printed

U.S. GOVERNMENT PRINTING OFFICE
39-011 O WASHINGTON : 1979

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To the Congress of the United States:

Today I am proposing to the Congress a National Health Plan. This major new initiative will improve health care for millions of Americans and protect all our people against the overwhelming financial burdens of serious illness.

It has been 30 years since President Truman challenged Congress to secure for all Americans access to quality health care as a matter of right. It has been nearly 15 years since the Congress, responding to the leadership of Presidents Kennedy and Johnson, finally enacted Medicare and Medicaid. Now, after a decade and a half of inaction, it is time to move forward once again.

I have consulted with the Congress, with consumers, with leaders of labor, management, and the health care industry, and have carefully weighed every option. My proposal is practical, premised on effective cost controls, and consistent with sound budget practices. It will:

—protect all Americans from the cost of catastrophic illness or accident

—extend comprehensive health coverage to almost 16 million low-income Americans

—provide coverage for prenatal, delivery, postnatal, and infant care, without cost-sharing

—establish Healthcare, which will provide more efficient Federal administration of health coverage for the poor and the elderly

—reform the health care system to promote competition and contain costs

—create both the framework and the momentum for a universal, comprehensive national health plan.

Protection from Catastrophic Expenses

No American should live in fear that a serious illness or accident will mean bankruptcy or a lifetime of debt. Yet today over 80 million Americans are unprotected against devastating medical costs, and millions more can lose the protection they now have because of unemployment or the death of a working spouse.

This National Health Plan will protect every American from the serious financial burden caused by major illness and injury. All employers will provide catastrophic coverage for full-time employees and their families, with subsidies to ease the burden on small businesses. No family will be required to pay more than $2,500 for medical expenses in a single year. Americans who are not covered elsewhere can obtain affordable catastrophic coverage from a special Federal program. Under this special program, no one will be denied coverage because he or she is labelled a "bad medical risk."

Expanded Benefits for the Elderly

The cost of health care falls most cruelly on America's older citizens who, with reduced incomes, have the highest medical expenses. Because Medicare places limits on hospital days and places no ceiling on out-of-pocket expenses, serious illness threatens senior citizens with loss of their homes and their life savings. Under the National Health Plan, the elderly will have unlimited hospital coverage and will be required to pay no more than $1,250 for medical expenses in a single year.

Today, the elderly also face heavy financial burdens because physicians increasingly charge more than the Medicare fee. Under the National Health Plan, physicians would be prohibited from charging elderly patients more than the allowable fee.

Improved Program for the Poor

The National Health Plan also provides expanded benefits for the poor. The Plan will extend comprehensive coverage—full physician, hospital and related services—to all Americans with incomes below 55 percent of poverty ($4,200 for a family of four). In addition, persons with incomes above 55 percent of poverty will be able to "spend-down" into comprehensive coverage if their medical expenses in a given year reduce their income to the eligibility level. A family of four with an income of $4,500, for example, will be covered after $300 of medical expenses. Under these provisions, 15.7 million poor people, including 1.2 million elderly, will receive comprehensive coverage for the first time.

Today the existence of 53 separate State and territorial Medicaid programs impedes efficient management. Under the National Health Plan, the administration of programs for the poor and the elderly will be significantly upgraded by the creation of a single new Federal program—Healthcare. Healthcare will improve claims processing, reduce error rates in eligibility determination, and facilitate detection of fraud and abuse.

Health Services for Mothers and Infants

Prevention is the best way to eliminate the suffering and cost of illness, and one of the most effective preventive health measures we can take is to assure health care for expectant mothers and infants. We have been far too slow to learn this lesson. Our infant mortality rates are higher than those of eleven other nations. This inexcusable record can and will be corrected.

Under the National Health Plan, employers will provide employees and their families with coverage for prenatal care, delivery, and infant care to age one, without any cost-sharing. A high priority in future years must be to expand this coverage to include children up to age six. The employer provisions of the Plan, combined with the Child Health Assurance Plan I have already proposed for low-income expectant mothers and children, will assure that no newborn child in this country will be denied the chance for a full and productive life by the high costs of health care.

Extended Insurance Coverage

Today, many employees and their families suddenly lose all health coverage when the employee is laid off or is between jobs. Under the National Health Plan, employer-based insurance policies will be required to maintain coverage for 90 days after employment ends. In addition, employer-based policies will be required to maintain family coverage for 90 days after an employee's death, and to cover dependents until age 26.

Cost Containment

A renewed emphasis on cost containment must accompany new health benefits. The American people now spend over 9 percent of the Gross National Product on health services—$200 billion a year. Hospital costs in America are rising $1 million an hour, 24 hours a day. It is time to draw the line.

The National Health Plan is premised on passage of strong hospital cost containment legislation, which will save the American people $53 billion over the next 5 years, including $28 billion in Federal, State, and local expenditures. The Nation cannot afford expanded coverage without hospital cost containment legislation. In addition, my National Health Plan proposes a $3 billion annual limit on hospital capital expenditures. This Nation cannot support more duplicative facilities and more unnecessary equipment. We must not add to the 130,000 excess hospital beds we now have. We must and we will insure that needed extensions in coverage do not become the excuse for further waste.

This Plan will also provide for a mandatory fee schedule for physicians who serve Healthcare patients. The fee schedule will curb excessive inflation in physician fees and will reduce the disparities in fees paid to rural physicians as compared to urban physicians, and primary care physicians as compared to specialists. Over time, the new fee schedule will help produce a better geographic distribution of physicians and increase the availability of primary care services.

The Healthcare fee schedule will provide a model for private health insurance plans. Private plans will publish the names of physicians who agree to adhere to the Healthcare fee schedule for all their patients. To assure that Blue Shield and similar organizations reexamine their physician reimbursement policies, the Plan will prohibit physician domination of the governing boards of these organizations.

Increased Competition

Competition has been weak in the health care industry because a very high percentage of costs are paid by third parties, and because patients generally cannot determine or shop for the services they need. In recent years, however, health maintenance organizations (HMOs) have injected important competitive forces into the health care system. The National Health Plan will encourage further competition by giving employees and Healthcare beneficiaries new financial incentives to enroll in HMOs or other cost-effective health plans.

Employers will be required to make equal contributions to the various health plans they offer their employees. Employees who choose more cost-effective plans will either pay lower premiums, receive additional compensation, or receive expanded health benefits.

The Healthcare program will pay a fixed amount on behalf of elderly beneficiaries who choose to enroll in HMOs. If the HMO can provide the standard Healthcare benefit package for less than the fixed amount, it must offer additional health benefits to the patient.

The Plan also promotes competition by requiring Healthcare to use competitive bidding to select private companies to perform claims processing and related functions. Demonstration projects by the Department of Health, Education, and Welfare have shown that this change will produce significant administrative savings.

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Framework for a Comprehensive Plan

A universal, comprehensive national health insurance program is one of the major unfinished items on America's social agenda. The National Health Plan I am proposing today creates both the framework and the momentum to reach that long-sought goal. In future years, the Plan can be expanded to include all low-income persons. Employer coverage can be made more fully comprehensive, with subsidies to ease the burden on small businesses. First-dollar coverage for preventive services can be extended throughout early childhood. I am today sending to the Congress an outline of a fully comprehensive plan which builds upon the significant health care improvements that I am asking the Congress to enact this session.

Consistent with current budgetary constraints, new Federal spending for the National Health Plan will not begin until fiscal year 1983. When the Plan is fully implemented, the Federal budget cost in 1980 dollars will be $18 billion and the premium cost to employers and employees will be $8 billion. A substantial portion of these expenditures reflect reduced out-of-pocket expenses for individuals and reduced spending by State and local governments for their health programs. These expenditures are a social investment in the future of our children, the economic security of our elderly, and the well-being and peace of mind of all Americans. They are an investment in a more effective and efficient health care system. Over time, the Plan's emphasis on prevention, competition, and cost containment will reap important dividends for our Nation and its people.

I urge the Congress not to lose this precious opportunity for progress. The real needs of our people are not served by waiting and hoping for a better tomorrow. That tomorrow will never come unless we act today. The National Health Plan I propose will provide millions of our citizens with better health, greater economic security, and more productive, dignified, and hopeful lives. The American people have waited long enough. I call on the Congress to act without delay.

JIMMY CARTER.

THE WHITE HOUSE, *June 12, 1979.*

JUN 18 1979

96th Congress, 1st Session - - - - - - House Document No. 96-149

OIL, HAZARDOUS SUBSTANCES, AND HAZARDOUS WASTE RESPONSE, LIABILITY, AND COMPENSATION ACT OF 1979

COMMUNICATION

FROM

THE PRESIDENT OF THE UNITED STATES

TRANSMITTING

A DRAFT OF PROPOSED LEGISLATION TO AMEND THE FEDERAL WATER POLLUTION CONTROL ACT, AS AMENDED, AND THE SOLID WASTE DISPOSAL ACT, AS AMENDED, TO PROVIDE A SYSTEM OF RESPONSE, LIABILITY, AND COMPENSATION FOR RELEASES OF OIL, HAZARDOUS SUBSTANCES, AND HAZARDOUS WASTES, TO ESTABLISH A RESPONSE AND LIABILITY FUND, AND FOR OTHER PURPOSES

JUNE 13, 1979.—Referred to the Committees on Interstate and Foreign Commerce, Merchant Marine and Fisheries, and Public Works and Transportation and ordered to be printed

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THE WHITE HOUSE,
Washington, June 13, 1979.

HON. THOMAS P. O'NEILL, Jr.,
Speaker of the U.S. House of Representatives,
Washington, D.C.

DEAR MR. SPEAKER: Today I am transmitting legislation to address some of the most significant environmental and public health problems facing our Nation. The problems which the legislation is designed to address are extremely serious. Recent months have focused public attention on a series of past improper hazardous waste disposal incidents such as the tragedy of Love Canal, New York. This case clearly demonstrates the unacceptable costs of improper hazardous waste disposal which may accrue from other incidents such as:

Contamination of surface and ground waters including drinking water supplies;

Staggering financial costs of cleaning up and containing wastes; and

Acute poisoning, carcinogenicity, mutagenicity, and promotion of miscarriages and birth defects.

The proposed legislation is a comprehensive program with the financial responsibility shared by Federal, State and local governments as well as industry. For spills of oil or hazardous substances, the legislation establishes a comprehensive and uniform system of notification, emergency response, enforcement, liability and limited economic compensation for such incidents. For uncontrolled sites, the proposed legislation would establish essentially the same program but without economic compensation. This comprehensive program would be implemented by:

Requiring notification of spills and the presence of uncontrolled hazardous waste disposal sites;

Empowering the Federal Government to clean up and mitigate pollution in those incidents where the liable parties do not respond adequately or cannot be quickly identified;

Enforcing higher standards of care in the handling of oil, hazardous substances and hazardous wastes including recovery from liable parties of governmental response costs and economic compensation;

Providing compensation for the economic damages sustained by innocent victims of spills.

The States have a significant role in implementing this legislation. Although the proposed legislation authorizes Federal action in emergency situations, the States are expected to provide financing for both the short-term and long-term containment of releases from hazardous dumpsites.

The legislation provides a major innovation in the manner we approach environmental rehabilitation. In particular, those elements of the private sector which produce hazardous chemicals will share, along with the Federal and State governments, in the financial responsibility for meeting the goals of the legislation through a system of fees.

The legislation provides for a mid-term evaluation. Within three years of enactment a report will be submitted to the Congress which would include experience to date in implementing the legislation; the extent, if any, of the critical uncontrolled sites problem; projected funds required for spill response; extent of State participation; and recommendations for statutory modification in such areas as fee structure, fund operation, liability limits, and financial responsibility limits.

It has become abundantly clear over the past several months that exposure of humans and the environment to dangers from spills of oil, hazardous substances and hazardous wastes and from releases at uncontrolled hazardous waste disposal sites are two of the most pressing environmental problems facing the Nation. I believe that the proposed legislation represents a comprehensive and effective approach for protecting people and the environment from such incidents. I am hopeful that this proposal will receive prompt consideration and speedy enactment. The health of the public and the environment cannot afford less.

Sincerely,

JIMMY CARTER.

A BILL To amend the Federal Water Pollution Control Act, as amended, and the Solid Waste Disposal Act, as amended, to provide a system of response, liability, and compensation for releases of oil, hazardous substances, and hazardous wastes, to establish a response and liability fund, and for other purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Oil, Hazardous Substances, and Hazardous Waste Response, Liability, and Compensation Act of 1979."

SEC. 2. Section 7003 of the Solid Waste Disposal Act, as amended, is further amended by striking "is presenting" and inserting in lieu thereof "may present" and by striking "the alleged disposal" and inserting in lieu thereof "such handling, storage, treatment, transportation or disposal".

SEC. 3. Subtitle G of the Solid Waste Disposal Act, as amended, is further amended by adding the following new section:

> "SEC. 7010. For purposes of administering or enforcing Subtitle C or Section 7003 of this title, the Administrator or the Attorney General of the United States, as appropriate, may by subpoena require the attendance and testimony of witnesses and production of reports, papers, documents, answers to questions and information that the Administrator or the Attorney General deems necessary. Witnesses shall be paid the same fees and mileage that are paid witnesses in the Courts of the United States. In the event of contumacy, failure, or refusal of any person to obey any such subpoena, any district court of the United States in which venue is proper shall have jurisdiction to order any such person to comply with such subpoena. Any failure to obey such an order of the court is punishable by the court as a contempt thereof."

SEC. 4. The Federal Water Pollution Control Act, as amended, is further amended by adding at the end thereof the following new title:

"TITLE VI—OIL, HAZARDOUS SUBSTANCES, AND HAZARDOUS RESPONSE, LIABILITY, COMPENSATION, AND FUND

DEFINITIONS

SEC. 601. For purposes of this title, the term—

(a) "act of God" means an unanticipated grave natural disaster or other natural phenomenon of an exceptional, inevitable, and irresistible character, the effects of which could not have been prevented or avoided by the exercise of due care or foresight;

(b) "Administrator" means the Administrator of the United States Environmental Protection Agency;

(c) "barrel" means forty-two United States gallons at 60 degrees Fahrenheit;

(d) "claim" means a demand in writing for a sum certain;

(e) "containment" means those least cost actions consistent with eventual permanent remedy, taken in the event of a release or significant threat of release from an uncontrolled hazardous waste disposal site to prevent or minimize the release of hazardous substances as defined in section 601(o)(3) so that they will not migrate to cause substantial danger to present or future public health or safety, or to a significant environmental resource. The term includes, but is not limited to such on-site actions as storage, confinement, perimeter protection using dikes, trenches or ditches, clay cover, neutralization, clean-up of released hazardous substances, recycling or reuse, diversion, destruction, segregation of reactive wastes, the replacement of leaking containers, collection of leachate and runoff, on-site treatment, and the monitoring to ensure that such actions protect the public health or safety, and the environment. The term does not include off-site transport of hazardous substances, storage, treatment, destruction, and/or redisposal off site except as provided in subsection (b) of section 603;

(f) "contiguous zone" means the entire zone established or to be established by the United States under article 24 of the Convention on the Territorial Sea and the Contiguous Zone;

(g) "emergency assistance" means actions up to a cost of $300,000 which the Administrator in his discretion determines must be immediately taken in the event of a release or the significant threat of a release from an uncontrolled hazardous waste disposal site to prevent, minimize, or mitigate the release of hazardous substances as defined in section 601(o)(3) so that they will not cause substantial danger to present or future public health or safety, or to a significant environmental resource. The term includes, but is not limited to, security fencing; provision of temporary alternative water supplies; temporary evacuation of threatened individuals not otherwise provided; and transportation, storage, destruction, or treatment and redisposal off site of hazardous substances where the Administrator determines that, due to the seriousness of the danger which may be created by the physical, chemical, or biological properties of the substances and the potential for human exposure, or the unavailability of on-site methods for preventing or minimizing the danger, such off-site actions are essential to protect the public health or safety or a significant environmental resource. The term also means any one or more of the following: (1) planning to determine the feasibility of containment; (2) monitoring and surveys to define the release or threat of release, the hazardous substances involved, and the danger to public health, safety, or the environment; (3) engineering, architectural, legal, fiscal, or economic investigations; and (4) studies, investigations, surveys, designs, plans, working drawings, specifications, procedures, or other necessary actions to provide for emergency assistance, containment, and recovery of the costs of emergency assistance and containment.

(h) "environment" means the environment within the United States and the environment which may be affected by pollution as defined in section 601(bb) of this title;

(i) "Executive" means the head of any Federal department, agency, or administration to whom the President of the United States delegates or assigns any of the powers or responsibilities granted by this title;

(j) "foreign claimant" means any person residing in a foreign country, the government of a foreign country, or any agency or political subdivision thereof, who asserts a claim;

(k) "fund" means the fund established by section 606 of this title;

(l) "gross negligence" means the failure to use even slight care, accompanied by a disregard for the consequences that may ensue from the act;

(m) "groundwater" means water in a saturated zone or stratagem beneath the surface of land or water, and any other water used as a source of public drinking water;

(n) "guarantor" means the person, other than the owner or operator, who provides evidence of financial responsibility for an owner or operator;

(o) "hazardous substance" means (1) any substance designated pursuant to section 311 of this Act prior to the effective date of this title, (2) any substance designated pursuant to section 602(a)(2) of this title; and (3) any waste (A) having the characteristics identified in or (B) listed pursuant to section 3001 of the Solid Waste Disposal Act, as amended;

(p) "inland oil barge" means a non-self-propelled vessel, certificated to carry oil in bulk as cargo and certificated to operate only on the inland waters of the United States while operating in those waters;

(q) "inland waters of the United States" means the United States portion of the Great Lakes and those waters of the United States lying inside the baseline from which the territorial sea is measured and those waters outside that baseline which are a part of the Gulf Intracoastal Waterway;

(r) "internal waters" means waters lying inside the baseline from which the territorial sea is measured, as recognized by the United States;

(s) "navigable waters" or "navigable waters of the United States" means the waters of the United States, including the territorial seas;

(t) "offshore facility" means any facility of any kind located in, on, or under, any of the navigable waters of the United States, and any facility of any kind which is subject to the jurisdiction of the United States and is located in, on, or under any other waters, other than a vessel or a public vessel;

(u) "oil" means oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil;

(v) "onshore facility" means any facility (including, but not limited to, motor vehicles and rolling stock) of any kind located in, on, or under, any land within the United States, but does not include an uncontrolled hazardous waste disposal site or any facility which has qualified for interim status or received a final permit under Subtitle C of the Solid Waste Disposal Act, as amended;

(w) "otherwise subject to the jurisdiction of the United States" means subject to the jurisdiction of the United States by virtue of United States citizenship, United States vessel documentation or numbering, or as provided for by international agreement to which the United States is a party;

(x) "owner or operator" means (1) in the case of a vessel, any person owning, operating, or chartering by demise, such vessel, and (2) in the case of an onshore facility, an offshore facility or an uncontrolled hazardous waste disposal site, any person owning or operating such facility or site, and (3) in the case of any abandoned offshore or onshore facility, the person who owned or operated such facility immediately prior to such abandonment;

(y) "person" means an individual, firm, corporation, association, partnership, consortium, joint venture, commercial entity, State municipality, commission, political subdivision of a State, or any interstate body;

(z) "petrochemical feedstock" means liquid or gaseous hydrocarbon used primarily for the preparation of more complex chemicals, i.e., ethylene, propylene, butylenes, butadiene, butanes, benzenes, toluene, xylenes naphthalene, carbon black, and methane other than that used to make ammonia.

(aa) "petroleum oil" means petroleum, including crude petroleum or any fraction or residue therefrom;

(bb) "pollution" means oil or a hazardous substance other than a hazardous waste as defined in section 601(o)(3) of this title—

(1) released from a vessel or an onshore facility in violation of subsection (b) of section 602 of this title; or

(2) released from a vessel engaged in any segment of the movement of oil loaded at the terminal facilities of the pipeline authorized by the Trans-Alaska Pipeline Authorization Act, as amended by this Act (43 U.S.C. 1651 et seq.) for transportation to a port under the jurisdiction of the United States, and released from that vessel prior to being brought ashore in such a port; or

(3) in or on the territorial sea, internal waters, or immediately adjacent shoreline, of a foreign country, in a case where damages are recoverable by a foreign claimant under this title; or

(4) in or on the waters of the high seas which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of, the United States;

(cc) "public vessel" means a vessel owned or bareboat-chartered and operated by the United States, or by a State or political subdivision thereof, or by a foreign nation, except when such vessel is engaged in commerce;

(dd) "refinery" means a permanently situated facility, located in the United States, which receives crude petroleum oil for the purpose of refinement;

(ee) "release" includes, but is not limited to any spilling, leaking, pumping, pouring, emitting, emptying, discharging, escaping, leaching, or dumping into the environment, but excludes (1) discharges in compliance with a permit under section 402 of this Act, (2) discharges resulting from circumstances identified and reviewed and made a part of the public record with respect to a permit issued or modified under section 402 of this Act and subject to a condition in such permit, (3) continuous or anticipated intermittent discharges from a point source, identified in a permit or permit application under section 402 of this Act, which are caused by events occurring within the scope of relevant operating or treatment systems, (4) releases from a hazardous waste treatment, storage, or disposal facility in compliance with any interim status standards promulgated by the Administrator under Subtitle C of the Solid Waste Disposal Act, as amended, or any final permit under said Act, (5) any release in compliance with a permit issued under section 102 or section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972, as amended, and (6) any injection of fluids authorized under applicable underground injection control programs pursuant to Part C of the Safe Drinking Water Act, as amended;

(ff) "removal costs" means (1) costs incurred under subsections (a) or (e) of section 603 of this title; section 5 of the Intervention on the High Seas Act, or subsection (b) of section 18 of the Deepwater Port Act of 1974, as amended by this Act and (2) other costs of reasonable measures taken after an incident resulting in the release or threatened release of oil or a hazardous substance to prevent, minimize, or mitigate damage from that incident, but does not include costs of emergency assistance or containment;

(gg) "remove" or "removal" refers to the cleanup or removal of released oil or hazardous substances from the environment, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or safety, or to the environment, which may otherwise result from a release or threat of release;

(hh) "ship" means either of the following types of vessel constructed or adapted primarily to carry oil or hazardous substances in bulk as cargo in the cargo spaces;

(1) a self-propelled vessel, or

(2) a non-self-propelled vessel which is not an inland oil barge;

(ii) "strict liability" or "strictly liable" means liability for the release of oil or a hazardous substance as defined in this title regardless of negligence, knowledge, good faith, intent, surrounding circumstances, degree of care, or any reasonable precautions;

(jj) "supplier" means any person who either produces, manufactures, or imports petrochemical feedstocks or inorganic elements and compounds and either provides, through sale or any other means, these feedstocks or elements and compounds to other persons, or uses those feedstocks or elements and compounds himself;

(kk) "uncontrolled hazardous waste disposal site" means any natural or man-made facility or site of any kind located in, on, or under, any land or waters within the United States which has been or is being used, in whole or in part, for the storage of hazardous substances as defined in section 601(o)(3) (A) or (B) of this title, or for the retention, disposal, deposit, injection, placing, or treatment, or dumping of hazardous substances, but does not include any facility which is subject to regulation under Subtitle C or D of the Solid Waste Disposal Act, as amended;

(ll) "United States" and "State" include the several States of the United States, the District of Columbia, the Commonwealth of Puerto Rico, the Canal Zone, Guam, American Samoa, the United States Virgin Islands, the Commonwealth of the Northern Marianas, and any other territory or possession over which the United States has jurisdiction;

(mm) "United States Claimant" means any person residing in the United States, the Government of the United States or an agency thereof, or the government of a State or a political subdivision thereof, who asserts a claim;

(nn) "vessel" means every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water other than a public vessel.

PROHIBITED RELEASES, NOTICES, PENALTIES

SEC. 602. (a)(1) The Congress hereby declares that it is the policy of the United States that there should be no releases of oil or hazardous substances into the environment.

(2) The Administrator shall develop, promulgate, and revise as may be appropriate, regulations designating as hazardous substances, other than those referred to in section 601(o) (1) and (3) of this title, such elements and compounds which, when released in any quantity into the environment, may present substantial danger to the public health or safety, or to the environment.

(3) The Administrator shall by regulation determine for the purposes of this title those quantities of oil and any hazardous substances as defined in section 601(o) (1) and (2) of this title, the release of which may be harmful to the public health or safety, or to the environment.

(b) The release of oil or hazardous substances, other than hazardous wastes as defined in section 601(o)(3) (A) or (B) of this title, either into or upon (1) land, (2) groundwater, (3) the navigable waters of the United States or the waters of the contiguous zone, or in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or which may affect natural resources belonging to, appertaining to, and under the exclusive management authority of the United States (including resources under the Fishery Conservation and Management Act of 1976), in such quantities as may be harmful, as determined by the Administrator under subsection (a)(3) of this section, is prohibited, except (1) in the case of such release of oil into the waters of the contiguous zone or which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Fishery Conservation and Management Act of 1976), where permitted under the International Convention for the Prevention of Pollution of the Sea by Oil, 1954. as amended, or other international agreement to which the United States is a party and which is intended to replace that Convention, or (2) where permitted in quantities and at times and locations or under such circumstances or conditions as the Executive may, by regulation, determine not to be harmful. Any regulations issued under this subsection shall be consistent with maritime safety and with marine and navigation laws and regulations and applicable water quality standards.

(c)(1) Any person, including, for purposes of this paragraph, any agency or department of the United States Government, in charge of a vessel or any public vessel owned by the United States or a State or political subdivision thereof or an onshore facility or an offshore facility shall, as soon as he has knowledge of any release of oil or a hazardous substance from such vessel or facility in violation of subsection (b) of this section, immediately notify the appropriate agency of the United States Government of such release.

(2) Any person—

(A) in charge of a vessel from which oil or a hazardous substance is released in violation of subsection (b) of this section into or upon the navigable waters of the United States, adjoining shorelines, or unto or upon the waters of the contiguous zone, or

(B) in charge of a vessel from which oil or a hazardous substance is released in violation of subsection (b) of this section in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Fishery Conservation and Management Act of 1976), and who is otherwise subject to the jurisdiction of the United States at the time of the release, or

(C) in charge of an onshore facility or an offshore facility from which oil or a hazardous substance is released in violation of subsection (b) of this section, who fails to notify immediately the appropriate agency of the United States

best copy available

Government as soon as he has knowledge of such release shall, upon conviction, be fined not more than $10,000, or imprisoned for not more than one year, or both.

Any person subject to criminal penalties for failure to provide notice of a release pursuant to this subsection who fails to do so shall not be entitled to the limitation of liability set out in subsection (c) of section 604 of this title. Notification received pursuant to this paragraph or information obtained by the exploitation of such notification shall not be used against any such person in any criminal case, except a prosecution for perjury or for giving a false statement.

(d)(1) Within 90 days of the effective date of this Act, or, if regulations have not been promulgated at that time under sections 3001 and 3004 of the Solid Waste Disposal Act, as amended, within 180 days of promulgation of such regulations, any person who may be subject to liability for an uncontrolled hazardous waste disposal site under subsection (b) of section 604 of this title shall notify the Administrator of the existence of such site, specifying the amount and type of any oil or hazardous substances to be found there, and any known, suspected, or likely releases of such substances from such site. The Administrator may prescribe the manner and form of the notice and the information to be included. Any such person who knowingly fails to notify the Administrator of the existence of any such site shall, upon conviction, be fined not more than $10,000, or imprisoned for not more than one year, or both. In addition, any such person who fails to provide the notice required by this subsection shall not be entitled to the limitation of liability set out in subsection (c) of section 604 of this title or the defenses to liability set out in subsection (d) of section 604 of this title.

(2) Following provision of notification of the existence of an uncontrolled hazardous waste disposal site under paragraph (1) of this subsection, any person who, pursuant to section 604(b) of this title, may be liable for a release or threat of release of oil or a hazardous substance from the site who takes action to remove, mitigate, or lessen the likelihood of a release or threat of release shall, in the event of such release or threat of release be entitled to subtract from any amount for which he may be liable under that section that portion of the costs of such actions as the Administrator may approve as reasonable and appropriate. *Provided*, however, that nothing contained in this paragraph shall in any way be deemed or interpreted to limit or affect any liability such person may have to any other party as a result of the release or threat of release.

(3) After the effective date of this Act, it shall be unlawful for any person required to provide the notification of an uncontrolled hazardous waste disposal site set out in paragraph (1) of this subsection knowingly to destroy, mutilate, erase, dispose of, conceal or otherwise render unavailable or unreadable any records relating to the site or any hazardous substances contained or deposited therein. Any person who violates this paragraph shall, upon conviction, be fined not more than $20,000, or imprisoned for not more than one year, or both.

(e)(1) Any owner, operator, or person in charge of any onshore facility or offshore facility from which oil or a hazardous substance is released in violation of subsection (b) of this section shall either be assessed a civil penalty by the Secretary of the department in which the Coast Guard is operating of not more than $5,000 for each offense or, in the case of releases of hazardous substances, be subject to a civil action under paragraph (2) of this subjection. Any owner, operator, or person in charge of any vessel from which oil or a hazardous substance is released in violation of subsection (b) of this section into or upon the navigable waters of the United States, adjoining shorelines, or into or upon the waters, of the contiguous zone, and any owner, operator, or person in charge of a vessel from which oil or a hazardous substance is released in violation of subsection (b) of this section in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974, or which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States (including resources under the Fishery Conservation and Management Act of 1976), and who is otherwise subject to the jurisdiction of the United States at the time of the release, shall either be assessed a civil penalty by the Secretary of the department in which the Coast Guard is operating of not more than $5,000 for each offense or, in the case of releases of hazardous substances, be subject to a civil action under paragraph (2) of this subsection. No penalty shall be assessed unless the owner or operator shall have been given notice and opportunity for a hearing on such charge. Each violation is a separate offense. Any such civil penalty may be compromised by such Secretary. In determining the amount of the penalty, or the amount agreed upon in compromise, the appropriateness of such penalty to the size of the business of the owner or operator charged, the effect on the owner or operator's ability to continue in business, and the gravity of the violation, shall be considered by such Secretary. The Secretary of the Treasury shall withhold at the request of such Secretary the clearance required by section 4197 of the Revised Statutes of the United States, as amended (46 U.S.C. 91), of any vessel the owner or operator of which is subject to the foregoing penalty. Clearance may be granted in such cases upon the filing of a bond or other security satisfactory to such Secretary.

(2) The Administrator, taking into account the gravity of the offense, and the standard of care manifested by the owner, operator, or person in charge, may, after consultation with the Secretary of the department in which the Coast Guard is operating, commence a civil action against any such person subject to a penalty under paragraph (1) of this subsection for the release of a hazardous substance to impose a penalty based on consideration of the size of the business of the owner or operator, the effect on the ability of the owner or operator to continue in business, the gravity of the violation, and the nature, extent, and degree of success of any efforts made by the owner, operator, or person in charge to minimize or mitigate the effects of such release. The amount of such penalty shall not exceed $50,000, except that where the United States can show that such release was the result of willful negligence or willful misconduct within the privity and knowledge of the owner, operator, or person in charge, such penalty shall not exceed $250,000. Each violation is a separate offense. Any action under this paragraph may be brought in the district court of the United States for the district in which the defendant is located or resides or is doing

business, and such court shall have jurisdiction to assess such penalty. No action may be commenced under this clause where a penalty has been assessed under paragraph (1) of this section.

(3) Civil penalties shall not be assessed under both this section and section 309 of this Act for the same release.

(4) Any costs of removal incurred in connection with a release excluded by section 601(ee) (1), (2), (3), (4), (5), or (6) of this title shall be recoverable from the owner or operator of the source of the release. The Administrator is authorized to commence a civil action for such costs in the district court of the United States for any district in which the owner or operator is located or resides or is doing business, and such court shall have jurisdiction to order the payment of the costs and to grant any and all other appropriate relief. Any moneys received by the Administrator pursuant to this paragraph shall be deposited in the fund.

EMERGENCY RESPONSE, ACTION TO REMOVE OR MITIGATE, NATIONAL CONTINGENCY PLAN, JUDICIAL RELIEF

SEC. 603. (a)(1) Whenever any oil or a hazardous substance is released or there is (A) a substantial threat of such a release into the environment, or (B) a release into the environment of any pollutant or contaminant which may present an imminent and substantial danger to the public health or welfare, the Executive is authorized to act to remove or arrange for the removal of such oil, hazardous substance, pollutant, or contaminant at any time, unless he determines such removal will be done properly by the owner or operator of the vessel or onshore facility or offshore facility or uncontrolled hazardous waste disposal site from which the release occurs.

(2) For the purposes of this subsection, the terms "release" and "released" shall include the discharge, release, and injections excluded by items (1), (2), (3), (4), (5), and (6) of section 601(ee) of this title, as well as all other releases included in that subsection.

(3) If the Administrator determines that the source of a release for which action is being taken pursuant to this subsection is an uncontrolled hazardous waste disposal site, that action shall be terminated immediately. A determination made under this paragraph shall not affect the liability of any person for the costs of any action taken, or affect in any way the payment of moneys obligated under paragraph (1) of this subsection prior to the date of the determination.

(b)(1) Whenever any hazardous substance as defined in section 601(o)(3) is released, or there is a substantial threat of such a release, from an uncontrolled hazardous waste disposal site, the Administrator is authorized to provide emergency assistance and containment of the hazardous substances or to arrange for the provision of such assistance and containment, unless he determines that the owner or operator of the site, or some other person, will properly provide such assistance and containment. *Provided, however*, That the Administrator shall not provide containment unless the State in which the site is located first enters into a contract providing adequate assurance that (A) it will provide for or otherwise assure any and all maintenance of containment and any and all containment costs which may prove necessary, beginning not later than one year from the date containment is first effectuated, as determined by the Administrator, and extending for 19 years or the expected life of the containment, whichever is less; and (B) that it will assure the availability of a hazardous waste disposal facility acceptable to the Administrator for any necessary offsite storage, destruction, treatment, or redisposal of the hazardous substances. *Provided further*, That the Administrator shall not provide containment projected by him to cost in excess of $2 0,000 for any site unless (A) he first determines that it is the least cost method of containing the hazardous substances over 20 years or the expected life of available containment methods, if less; and (B) the State, or other person, first enters into a contract providing adequate assurance that it will pay at least 10 per centum of the costs of first effectuating and maintaining for one year thereafter containment. *Provided further*, That the Administrator shall not provide containment at an uncontrolled hazardous waste disposal site owned by a State or a political subdivision of a State unless the State or subdivision first enters into a contract providing adequate assurance that it will pay at least 50 per centum of the costs of first effectuating containment and maintaining it for one year thereafter.

(2) Subject to the provisions of this title, the Administrator may pay for (A) 100 per centum of the costs of emergency assistance; and either (B) 100 per centum of the costs of first effectuating containment and maintaining it for one year thereafter, wherever the eligible costs of such containment do not exceed $200,000; (C) 90 per centum of the costs of first effectuating the containment and maintaining it for one year thereafter, wherever the eligible costs of such containment are in excess of $200,000; or (D) 50 per centum of the costs of first effectuating containment and maintaining it for one year thereafter wherever the uncontrolled hazardous waste disposal site is owned by a State or political subdivision thereof. Any payments for work incurred to effectuate containment shall at no time exceed the Federal share of the cost of such work incurred to the date of the voucher covering such payment plus the Federal share of the value of materials, chemicals, or other commodities which have been stockpiled in the vicinity of and for such containment activities.

(3) The State or political subdivision shall bear the cost of any remedial measures it may choose to take instead of the least cost containment, as determined by the Administrator, or in addition to any containment provided hereunder, such as complete waste and/or soil transport off site and treatment and redisposal at secured facilities off site. The Administrator is authorized, in lieu of providing containment or arranging for the provision of containment under paragraph (1) of this subsection, to reimburse the State or subdivision for such expenses, if approved by the Administrator, up to the amount which would have been necessary to effect the Federal share of any containment which could be provided thereunder.

(4)(A) Subject to the requirements of paragraph (1) of this subsection, the Administrator is authorized to provide for complete or partial waste transport, storage, destruction, or treatment and redisposal off site at secured facilities, or to arrange for the provision of such actions, if he determines that such actions are the least cost means of containment for an uncontrolled hazardous waste disposal site over a period of up to 20 years.

(B) Where the life cycle cost and environmental impact of providing for off-site transport of hazardous substances from two or more uncontrolled hazardous waste sites and of providing for centralized off-site storage, destruction, or treatment and redisposal at a secured facility off site does not exceed the total sum of the life cycle costs of the least cost containment at each of the sites, or the State or other person agrees by contract to pay the difference between the Federal share of the total sum of containment at each of the sites and the costs of centralized off-site transportation, storage, destruction, or treatment and redisposal, such centralized off-site actions shall be deemed to be the least cost means of containment, and the Administrator is authorized to provide for the transport of the wastes and their centralized off-site destruction, storage, or treatment and redisposal. *Provided*, the total cost of any action authorized by the Administrator under this clause shall not exceed the total sum of the Federal share of the costs of containment which could be authorized by him at each of the sites.

(5) Within 12 months after enactment of this title, if a State or political subdivision thereof can show to the satisfaction of the Administrator that it does not have legal authority to assume responsibility for maintenance of containment, or if it has such authority but has no legal authority to allocate funds for that purpose or to match the Federal share of containment, the Administrator may assume the responsibility for, and the costs of, first effectuating containment and/or maintenance of containment for up to an additional 12 months beyond the period provided for in paragraph (1) of this subsection if the State or political subdivision by contract agrees to assume the responsibility and subsequent costs at the end of such additional period, or to seek the legal authority to do so, as may be appropiate.

(6) If the Administrator provides containment pursuant to paragraph (1) of this subsection and the State or political subdivision thereof fails to comply with applicable requirements of any contract entered into pursuant to this subsection, the Administrator shall, after providing 60 days notice to the State, seek, in a court of competent jurisdiction to enforce the contract and/or to recover from the State the costs of maintaining such containment and the State or local share of the costs of containment at the site.

(7) Where a State or a political subdivision thereof is acting in behalf of the Administrator, the Administrator is authorized to provide technical and legal assistance in the administration and enforcement of any contract or subcontract in connection with emergency assistance or containment assisted under this title, and to intervene in any civil action involving the enforcement of such contract or subcontract.

(c) Within 180 days after the effective date of this section, the Executive shall revise and republish the National Contingency Plan for the removal of oil and hazardous substances, originally prepared and published pursuant to section 311 of this Act to reflect and effectuate the responsibilities and powers created by this title in addition to those matters specified in section 311(c)(2) of this Act on the date prior to the date of enactment of this title. In preparing such amendments, the Executive shall propose for public review and hold public hearings on a new section of the Plan to be known as the "National Uncontrolled Hazardous Waste Disposal Site Response Plan." Following such hearings, the Executive shall revise as necessary and finally adopt and publish the said Response Plan, which shall include at a minimum:

(1) methods for discovering and investigating such sites;

(2) methods for evaluating, including least cost analyses, and containing any releases of threats of releases from such sites which pose substantial danger to the public health or safety, or to significant environmental resources;

(3) methods and criteria for determining the appropriate extent of emergency assistance, containment, and other measures authorized by this title;

(4) appropriate roles and responsibilities for the Federal, State, and local governments and for interstate and non-governmental entities in effectuating the Plan;

(5) provision for identification, procurement, maintenance, and storage of response equipment and supplies; and

(6) a method for and assignment of responsibility for reporting the existence of uncontrolled hazardous waste disposal sites which may be located on federally owned or controlled properties and any releases of hazardous substances from such sites.

Following publication of the revised National Contingency Plan, the removal of oil and hazardous substances and actions to minimize damage from oil and hazardous substance releases shall, to the greatest extent possible, be in accordance with the provisions of the plan. The Executive may, from time to time as he deems advisable, revise, otherwise further amend, and republish the National Contingency Plan.

(d)(1) Consistent with the National Contingency Plan, the Executive may issue regulations consistent with maritime safety and with marine and navigation laws (A) establishing methods and procedures for removal of released oil and hazardous substances; (B) establishing criteria for the development and implementation of local and regional oil and hazardous substance removal contingency plans; (C) establishing procedures, methods, and equipment and other requirements for equipment to prevent release of oil and hazardous substances from vessels and from onshore facilities and offshore facilities, and to contain such releases; and (D) governing the inspection of vessels carrying cargoes of oil and hazardous substances and the inspection of such cargoes in order to reduce the likelihood of releases of oil and hazardous substances.

(2) Any owner or operator of a vessel or an onshore facility or an offshore facility and any other person subject to any regulation issued under paragraph (1) of this subsection who fails or refuses to comply with the provisions of any such regulations, shall be liable for a civil penalty of not more than $5,000 for each such violation. This paragraph shall not apply to any owner or operator of any vessel seaward of the territorial sea of the United States unless such owner or operator is otherwise subject to the jurisdiction of the United States. Each violation shall be a separate offense. The Executive may assess and compromise such penalty. No penalty shall be assessed until the owner, operator, or other person charged shall have been given notice and an opportunity for a hearing on such charge. In determining the amount

of the penalty, or the amount agreed upon in compromise, the gravity of the violation, and the demonstrated good faith of the owner, operator, or other person charged in attempting to achieve rapid compliance after notification of a violation, shall be considered by the Executive.

(e) Whenever a marine disaster in or upon the navigable waters of the United States has created a substantial threat of a pollution hazard to the public health or welfare of the United States, including, but not limited to, fish, shellfish, and wildlife and the public and private shorelines and beaches of the United States, because of a release, or an imminent release of large quantities of oil, or of a hazardous substance from a vessel, the United States may (1) coordinate and direct all public and private efforts directed at the removal or elimination of such threat; and (2) summarily remove, and, if necessary, destroy such vessel by whatever means are available without regard to any provisions of law governing the employment of personnel or the expenditure of appropriated funds. Any expense incurred under this subsection or under the Intervention on the High Seas Act (or the convention defined in section 2(3) thereof) shall be compensable as a removal cost under section 607 of this title.

(f) In addition to any other action taken by a State or local government, when the Executive determines there may be a substantial danger to the public health or safety of the United States, because of an actual or threatened release of oil or a hazardous substance from an onshore facility, an offshore facility, or an uncontrolled hazardous waste disposal site, the Executive may require the Attorney General of the United States to secure such relief as may be necessary to abate such threat, and the district court of the United States in the district in which the threat occurs shall have jurisdiction to grant such relief as the public interest and the equities of the case may require.

(g)(1) If any emergency assistance or containment activity is carried out by the Administrator pursuant to section 603(b)(1) of this title in relation to an uncontrolled hazardous waste disposal site located on property which is owned or operated by the person who owned or operated the property at the time it was utilized for the disposal of hazardous substances as defined in section 601(o)(3) of this title, and if the said person utilized the site at that time for the disposal of any such wastes produced by him, either at the site or elsewhere, and if said person failed to properly provide such emergency assistance or containment upon request of the Administrator, the Administrator may commence a civil action to impose a penalty against such person. The size of the penalty shall be based upon consideration of the size of the business of such person, the effect upon his ability to continue in business, the seriousness of any threat presented by the release or threatened release of hazardous substances as defined in section 601(o)(3) of this title from the site, and any efforts made by such person to minimize or mitigate the effects of any release or threat of release. Any penalty imposed hereunder shall be in addition to any costs of such emergency assistance or containment recovered from such person by the fund pursuant to this title. *Provided, however,* That in no event shall any penalty imposed hereunder exceed two and one-half times the amount of the costs of emergency assistance and/or containment incurred by the Administrator.

(2) Any action under this paragraph may be brought in the district court of the United States for the district in which the defendant is located or resides or is doing business, and such court shall have jurisdiction to assess and order the payment of such penalty and to grant any and all other appropriate relief. Any moneys received by the Administrator pursuant to this subsection shall be deposited in the fund.

(h) Anyone authorized by the Executive to enforce the provisions of this title may (1) board and inspect any vessel upon the navigable waters of the United States or the waters of the contiguous zone, (2) upon presentation of his credentials, have a right of entry to, upon, over, or through any premises or property containing an offshore facility or an onshore facility or an uncontrolled hazardous waste disposal site, or any premises or property where the effects of a release of oil or hazardous substances are being, or may reasonably be expected to be experienced, (3) while on such property, take samples or photographs and make any analyses he deems necessary of any soil, water, residues, wastes, air, or other substances suspected to be or to contain oil or hazardous substances, (4) with or without a warrant arrest any person who violates the provisions of this title, or any regulations issued thereunder in his presence or view, and (5) execute any warrant or other process issued by an officer or court of competent jurisdiction.

LIABILITY

Sec. 604(a). Subject to the provisions of subsections (c) and (d) of this section, the owner and operator of a vessel, other than a public vessel, or of an onshore facility or an offshore facility, which is the source of pollution, or which poses a threat of pollution in circumstances where removal costs are incurred, shall be jointly, severally, and strictly liable for all damages resulting from pollution or the threat thereof for which a claim may be asserted under section 607 of this title.

(b) Subject to the provisions of subsections (c) and (d) of this section, the owner and operator of an uncontrolled hazardous waste disposal site, if they caused or contributed or are causing or contributing to any release, or to the conditions which produce any such release, of a hazardous substance as defined in section 601(o)(3) of this title from such site, or the threat thereof where the costs described in subsection (d) of section 607 of this title are incurred, and any other person who caused or contributed or is causing or contributing to such incident, including but not limited to prior owners, lessees, and generators, transporters, or disposers of such hazardous substances, shall be jointly, severally, and strictly liable for all costs for which a claim may be asserted under that subsection.

(c)(1) Except when the pollution or threat thereof is caused in whole or in part by willful misconduct or gross negligence, within the privity or knowledge of the owner or operator of a vessel or an onshore or offshore facility, or in whole or in part by a violation, within the privity or knowledge of the owner or operator, of applicable public health, safety, construction, or operating standards or regulations of the Federal Government; or except where the owner or operator is subject to criminal penalties for failure to furnish any notice of a release required by subsection (c) of section 602 of this title, or fails or refuses to provide all reasonable cooperation and assistance requested by the responsible Federal official in furtherance of cleanup and removal, and

(2) Except when the release or threat of a release of a hazardous substance as defined in section 601(o)(3) of this title from an uncontrolled hazardous waste disposal site is caused in whole or in part by willful misconduct or gross negligence, within the privity or knowledge of any person liable under subsection (b) of this section, or in whole or in part by a violation within the privity or knowledge of any such liable person of any applicable public health, safety, construction, or operating standards or regulations of the Federal Government; or except where any such person fails to furnish the notice required by subsection (d) of section 602 of this title, or fails or refuses to provide all reasonable cooperation and assistance requested by the responsible Federal official in furtherance of emergency assistance or containment activities, the total of the liability under subsection (a) or subsection (b) of this section and any removal costs or costs of emergency assistance or containment recoverable by, or on behalf of, the owner or operator or other liable person shall be limited to—

(A) in the case of a vessel other than a ship or other than an inland oil barge, $150 per gross registered ton or $250,000, whichever is greater;

(B) in the case of an inland oil barge, $150,000 or $150 per gross registered ton, whichever is greater;

(C) in the case of a ship, $250,000 or $300 per gross registered ton (up to a maximum of $30,000,000), whichever is greater;

(D) in the case of an offshore facility operated under authority of the Outer Continental Shelf Lands Act, the total of removal costs plus $50,000,000; or

(E) in the case of an uncontrolled hazardous waste disposal site or an onshore facility or an offshore facility other than one described in paragraph (D), $50,000,000 unless a lesser limit is established by the Executive under subsection (e).

(d) There shall be no liability under subsection (a) or subsection (b) of this section where an owner, operator, guarantor, or other liable person can prove that—

(1) the pollution or release or threat thereof is caused solely by an act of God or an act of war;

(2) as to a particular claimant the economic loss is caused, in whole or in part, by the gross negligence or willful misconduct of that claimant; or

(3) as to a particular claimant to the extent that the economic loss is caused by the negligence of that claimant. *Provided*, however, that nothing contained in this subsection shall be construed or interpreted to limit or deny any claim presented by or on behalf of any authorized agency of the United States Government arising out of such agency's response to pollution or to a release or threat thereof pursuant to this title.

(e) The Executive may issue regulations establishing limits of liability of no less than $8,000,000 and no more than $50,000,000 for various classes of onshore facilities and offshore facilities other than those described in subsection (c)(2)(D) of this section and for uncontrolled hazardous waste disposal sites. Any such regulations shall take into account the size, type, location, storage and handling capacity, and other matters relating to the likelihood of releases of oil or hazardous substances involving those classes.

(f) The Executive shall, from time to time, report to Congress on the desirability of adjusting the monetary limitations of liability specified in subsection (c) of this section.

(g)(1) Subject to the provisions of paragraph (2) of this subsection, the fund shall be liable, to the extent that the loss is not otherwise compensated, for all valid claims for losses or damages for which a claim may be asserted under section 607 of this title. Should moneys to pay any such claim not be available in the fund, the Executive shall defer payment of the claim until moneys are available.

(2) Except for the removal costs specified in section 601(ff)(1) of this title, there shall be no liability under paragraph (1) of this subsection—

(A) where the pollution or release from an uncontrolled hazardous waste disposal site is caused solely by an act of war;

(B) as to a particular claimant where the economic loss is caused, in whole or in part, by the gross negligence or willful misconduct of that claimant. *Provided*, however, that nothing contained in this clause shall be construed or interpreted to limit or deny any claim presented by or on behalf of any authorized agency of the United States Government arising out of such agency's response to pollution or to a release or threat thereof pursuant to this title.

(h)(1) In addition to the damages and costs for which claims may be asserted under section 607 of this title, and without regard to the limitation of liability provided in subsection (c) of section 604 of this title, any person or persons liable under subsection (a) or subsection (b) of this section shall also be jointly and severally liable to the claimant for interest on the amount paid in satisfaction of the claim for the period from the date upon which the claim was presented to such person to the date upon which the claimant is paid, inclusive, less the period, if any, from the date upon which the liable person shall offer to the claimant an amount equal to or greater than that finally paid in satisfaction of the claim to the date upon which the claimant shall accept that amount, inclusive. However, if the liable person shall offer to the claimant, within sixty days of the date upon which the claim was presented, or of the date upon which advertising was commenced pursuant to section 608 of this title, whichever is later, an amount equal to or greater than that finally paid in satisfaction of the claim, the liable person shall be liable for the interest provided in this paragraph only from the date the offer was accepted by the claimant to the date upon which payment is made to the claimant, inclusive.

(2) The interest provided in paragraph (1) of this subsection shall be calculated at the average of the highest rate for commercial and finance company paper of maturities of one hundred and eighty days or less obtaining on each of the days included within the period for which interest must be paid to the claimant, as published in the Federal Reserve Bulletin.

(i) No indemnification, hold harmless, or similar agreement shall be effective to transfer from the owner or operator of a facility, or from any person who may be liable for a release or threat of release from an uncontrolled hazardous waste disposal site pursuant to subsection (b) of this section, to any other person the liability imposed under subsection (a) or (b) of this section, other than as specified in this title. *Provided*, That this provision does not preclude an agreement whereby the holder of a leasehold interest for the exploration of oil agrees to indemnify for, or hold harmless from, that liability the owner or operator of a facility which is, by contract or other agreement, engaged in activity on behalf of the holder of the leasehold interest.

(j) Nothing in this title, including the provisions of subsection (i) of this section, shall bar a cause of action that an owner or operator or any other person subject to liability under subsections (a) or (b) of this section, or a guarantor, has or would have, by reason of subrogation or otherwise against any person.

(k) To the extent that they are in conflict with, or otherwise inconsistent with, any other provisions of Federal law relating to liability or the limitation thereof, the provisions of this section shall supersede all such other provisions of law, including those of subsection (a) of section 4283 of the Revised Statutes, as amended (46 U.S.C. 183(a)).

FINANCIAL RESPONSIBILITY

SEC. 605(a)(1) The owner or operator of any vessel (except a non-self-propelled barge that does not carry oil or hazardous substances as fuel or cargo) over three hundred gross tons, which uses an offshore facility or the navigable waters shall establish and maintain in accordance with regulations promulgated by the Executive, evidence of financial responsibility sufficient to satisfy the maximum amount of liability to which the owner or operator of such vessel would be exposed in a case where there is an entitlement to limit liability in accordance with the provisions of subsection (c) of section 604 of this title, *Provided*, That the Executive may prescribe by regulation levels of financial responsibility requirements applicable to persons owning or operating more than one vessel; *Provided further*, That in no case may the total amount of financial responsibility so prescribed be less than the amount applicable to the largest of those vessels as determined under this paragraph. Financial responsibility may be established by any one, or any permitted combination, of the following methods acceptable to the Executive: evidence of insurance, guaranty, surety bond, or qualification as a self-insurer. Any bond filed shall be issued by a surety company authorized to do a surety business in at least one of the United States.

(2) The Secretary of the Treasury shall refuse the clearance required by section 4197 of the Revised Statutes of the United States to any vessel subject to this subsection which does not have certification furnished by the Executive that the financial responsibility provisions of paragraph (1) of this subsection have been complied with.

(3) The Secretary of Transportation, in accordance with regulations promulgated by him, shall (A) deny entry to any port or place in the United States, or to the navigable waters of the United States, to, and (B) detain at the port or place in the United States from which it is about to depart for any other port or place in the United States, any vessel subject to this subsection which, upon request, does not produce certification furnished by the Executive that the financial responsibility provisions of paragraph (1) of this subsetion have been complied with.

(b) The owner or operator of an offshore facility which (1) is used for drilling for, producing, or processing oil, or (2) has the capacity to transport, store, transfer, or otherwise handle more than one thousand barrels of oil at any one time, shall establish and maintain, in accordance with regulations promulgated by the Executive, evidence of financial responsibility sufficient to satisfy the maximum amount of liability to which the owner or operator of the facility would be exposed, in a case where he would be entitled to limit his liability in accordance with the provisions of section 604(c) of this title, or $50,000,000, whichever is less; *Provided*, That the Executive may prescribe by regulation levels of financial responsibility requirements applicable to persons owning or operating more than one facility; *Provided further*, That in no case may the financial responsibility requirement prescribed be less than the highest amount applicable to any one of those facilities as determined under this subsection.

(c)(1) Any person who fails to comply with the requirements of subsection (a)(1) or subsection (b) of this section, the regulations promulgated thereunder, or any denial or detention order issued under subsection (a)(3) of this section, shall be subject to a civil penalty of not more than $10,000.

(2) Such penalty may be assessed by the Executive; no penalty shall be assessed until notice and an opportunity for hearing on the alleged violation have been given. In determining the amount of penalty or the amount agreed upon in compromise, the demonstrated good faith of the party shall be taken into consideration.

(3) At the request of the Executive, the Attorney-General may bring an action in the name of the fund to collect the penalty assessed.

(d) Any claim authorized by subsection (a) of section 607 of this title may be asserted directly against any guarantor providing evidence of financial responsibility as required under this section. In defending such claim in respect to its merits, the guarantor shall be entitled to invoke all rights and defenses which would be available to the owner or operator under this title, but the guarantor may not invoke policy or contractual defenses otherwise available to him in an action brought by the owner or operator. If the guarantor's obligation to make payment of such a claim arises solely out of the requirements of this subsection, the guarantor is entitled to reimbursement from the owner or operator. The guarantor need not provide protection for costs, loss, or damage intentionally caused.

(e) The Executive shall conduct a study to determine (1) whether adequate private insurance protection is available on reasonable terms and conditions to the owners and operators of vessels, onshore facilities, offshore facilities, and uncontrolled hazardous waste disposal sites subject to liability under section 604 of this title, and (2) whether the market for such insurance is sufficiently competitive to assure purchasers of features such as a reasonable range of deductibles, co-insurance provisions and exclusions. The Executive shall submit the results of his study, together with his recommendations, within two years of the date of enactment of this Act, and shall submit an interim report on his study within one year of the date of enactment of this Act.

FUND ESTABLISHMENT, ADMINISTRATION, AND FINANCING

SEC. 606. (a) There is hereby established in the Treasury of the United States an Oil and Hazardous Substances Liability Fund, which shall be administered by the Executive. The fund may sue and be sued in its own name.

(b) The total moneys received by the fund from the appropriations and fees authorized by subsections (e) and (f) of this section shall not exceed $250,000,000 in fiscal year 1981, $375,000,000 in fiscal year 1982, $500,000,000 in fiscal year 1983, and $500,000,000 in fiscal year 1984.

(c) The fund shall be constituted from—

(1) such sums as may be appropriated to it, as provided for in subsection (e) of this section; and

(2) all fees collected pursuant to subsection (f) of this section;

(3) all moneys recovered on behalf of the fund under section 610 of this title;

(4) all moneys transferred from funds abolished pursuant to section 6 of this Act; and

(5) all other moneys recovered or collected on behalf of the fund under this title, including penalties assessed under this title, moneys recovered pursuant to section 602(e)(3) of this title, and interest received from the investment of moneys held in the fund pursuant to subsection (g) of this section.

(d)(1) The fund shall be available only to the extent and in such amounts as provided in appropriation acts for:

(A) removal costs described in clause (1) of subsection (s) of section 601 of this title;

(B) costs of emergency assistance described in subsection (ff) of section 601 of this title;

(C) costs of containment described in subsection (gg) of section 601 of this title;

(D) costs incurred pursuant to section 603(a)(1)(B) of this title;

(E) the processing, settlement, and payment of claims under section 609 of this title; and

(F) administrative and personnel costs of the Federal Government incident to the administration of this title, including but not limited to claims settlement activities and adjudicatory and judicial proceedings, and reports and studies required by this title, whether or not such costs are recoverable under section 610 of this title.

(e) There is hereby authorized to be appropriated to the fund from the general fund of the United States Treasury, not to exceed $50,000,000 in fiscal year 1981, $75,000,000 in fiscal year 1982, and $100,000,000 per year in fiscal years 1983 and 1984. Any and all sums appropriated to or deposited in said fund shall remain available until expended.

(f)(1) There is imposed upon the owners of refineries receiving crude or unfinished petroleum oil and upon the owners of any petroleum oil for export at the point of export or loading for export or of any petroleum oil for entry into the United States at the point of entry or unloading for entry, whether for import or transfer to a foreign country, a fee, not to exceed 3 cents per barrel of petroleum oil received, exported, or entered. *Provided, however*, That the total of fees imposed under this paragraph shall not exceed $60,000,000 in fiscal year 1981, $80,000,000 in fiscal year 1982, and $100,000,000 per year in fiscal years 1983 and 1984.

(2) There is imposed upon each supplier of petrochemical feedstocks a fee, not to exceed 0.5 cents per pound, on any amount of petrochemical feedstock supplied to another person or used by said supplier. *Provided, however*, that the total of fees imposed under this paragraph shall not exceed $90,000,000 in fiscal year 1981, $150,000,000 in fiscal year 1982, and $200,000,000 per year in fiscal years 1983 and 1984.

(3) There is imposed upon each supplier of inorganic elements and compounds a fee, not to exceed 2 dollars per ton, on any amount of inorganic element or compound supplied to another person or used by said supplier. The inorganic elements and compounds subject to this fee are—

(A) arsenic and the equivalent weight of arsenic in arsenic trioxide, cadmium, chromium and the equivalent weight of chromium in chromite, chromic acid, sodium dichromate, and potassium dichromate, lead and the equivalent weight of lead in lead oxide, and mercury;

(B) chlorine, hydrochloric acid, hydrofluoric acid, and bromine in methyl bromide and ethylene dibromide;

(C) phosphoric acid, sulfuric acid, nitric acid, potassium hydroxide, and sodium hydroxide;

(D) ammonia and the equivalent weight of ammonia in ammonium nitrate; and

(E) such other inorganic elements and compounds as the Administrator may deem appropriate, based upon information available to him as a result of listing or characterizing hazardous substances or of implementing this Act. *Provided, however*, that the total of fees imposed under this paragraph shall not exceed $50,000,000 in fiscal year 1981, $70,000,000 in fiscal year 1982, and $100,000,000 per year in fiscal years 1983 and 1984.

(4)(A) Any fees imposed by paragraphs (1), (2), and (3) shall be assessed and collected by the Secretary of the Treasury or his delegate, and the provisions of subtitle F of the Internal Revenue Code of 1954 shall apply to the assessment and collection of such fee as if such fee were a tax described in Chapter 32 of such Code.

(B) Any fees prescribed by this subsection shall be imposed only once on any quantity of petroleum oil, feedstock, element, or compound, except that any fee imposed on any quantity of refined petroleum used as feedstock shall be added, once and only once, to the fee imposed on that quantity pursuant to paragraph (1) of this subsection. The Administrator may recommend to the Secretary of the Treasury an economic incentive for recycling feedstocks and elements or compounds covered by this subsection by reducing the fee on such feedstocks and elements or compounds removed from the waste stream of a production process and recycled in such production process or reintroduced into products or used as a source of energy. The Secretary of the Treasury shall, based upon the recommendation of the Administrator, establish the amount of any such reduction of fee by regulation. *Provided, however*, that in no event shall any reduction of fee exceed the fee on such feedstock and element or compound.

(5) In no event shall the fee imposed with respect to a quantity of petrochemical feedstock or inorganic element or compound pursuant to paragraphs (2) or (3) of this subsection exceed two per centum of the price of the petrochemical feedstock or inorganic element or compound when sold at arms length by the supplier.

(6) From time to time, beginning two years after the establishment of the fund, the Administrator shall recommend to the Secretary of the Treasury any modification of the fees authorized by this subsection needed to assure, to the extent reasonably possible, that the percentage of the total fees collected from each of the various authorized sources is equitable, based upon the claims and payments experience of the fund. Any such recommendation shall be based upon the annual reports provided for in subsection (a) of section 614 of this title. The Secretary of the Treasury shall, based upon the recommendation of the Administrator, establish the new fee schedule by regulation. No regulation that modifies fees promulgated by the Secretary of the Treasury, nor any modification of such a regulation, whether or not in effect, may be stayed by any court pending completion of judicial proceedings for the review of that regulation or modification.

(g)(1) The Secretary of the Treasury or his delegate shall, after consultation with the Secretary of Transportation and the Administrator, invest such portion of the fund, up to $50,000,000, as is not, in his judgment, required to meet current withdrawals. The primary purpose of this capital reserve is to assure the availability of money to cover the costs of Federal response actions.

(2) Any funds invested by the Secretary of the Treasury under paragraph (1) shall be in public debt securities with maturities suitable for the needs of the fund, as determined by said Secretary after consultation with the Secretary of Transportation and the Administrator and bearing interest at rates determined by the Secretary of the Treasury taking into consideration current market yields on outstanding marketable obligations of the United States of comparable maturities. The income on these investments shall be credited to and form a part of the fund.

(h) To the extent practicable, the Secretary of the Treasury shall keep precise records as to the sources of all moneys in the fund and as to all claims and payments made. For purposes of the annual report provided for in subsection (A) of section 614 of this title, claims and payments shall be categorized as claims and payments (1) for the release or threatened release of oil from uncontrolled hazardous waste disposal sites; (2) for the release or threatened release of hazardous substances from uncontrolled hazardous waste disposal sites; (3) for all other releases or threatened releases of oil; and (4) for all other releases or threatened releases of hazardous substances.

DAMAGE AND CLAIMANTS

SEC. 607. (a) Claims asserted and compensable but unsatisfied under provisions of the Trans-Alaska Pipeline Authorization Act, section 311 of this Act, the Deepwater Port Act of 1974, and title III of the Outer Continental Shelf Lands Act Amendments of 1978, which provisions are repealed or modified by section 6 of this Act may be asserted under this title; and other claims for damages for economic loss incurred on or after the effective date of this section, resulting from pollution, or for costs specified in section 601(ff)(1) of this title incurred by reason of a release or threat thereof, may be asserted under this title for—

(1) removal costs;

(2) injury to, or destruction of, real or personal property;

(3) injury to, or destruction of, natural resources, including costs for damage assessment; and

(4) loss of opportunity to harvest marine life due to injury to or destruction of natural resources.

(b) A claim authorized by subsection (a) of this section may be asserted—

(1) Under item 1,

(A) by any agency of the United States government,

(B) by any State, with respect to reimbursements allowed under the system established in the National Contingency Plan.

(C) by any United States claimant—

(i) who is an owner or operator of a vessel or an onshore facility or an offshore facility;

(ii) which is engaged in the storage, handling, or transportation of oil or hazardous substances; and

(iii) who, in the course of normal operations, maintains expertise, supplies, or equipment to be used for the removal of oil or hazardous substances; and

(iv) who, respecting a release not emanating from a vessel or an onshore facility or an offshore facility owned or operated by such claimant, incurs removal costs referred to in section 601(ff)(2) of this title, as certified by the responsible Federal official; or

(D) by any United States claimant who is an owner or operator of a vessel or onshore facility or offshore facility, for cleanup costs associated with a release occurring from that vessel or facility: *Provided:* That the owner or operator of a vessel or onshore facility or offshore facility who would otherwise be liable under subsection (a) of section 604 of this title may assert such a claim only if he can show that he is entitled to a defense to liability under section 604(d)(1) of this title or, if not entitled to such a defense to liability, that he is entitled to a limitation of liability under subsection (c) of section 604 of this title: *Provided further*, That where he is not entitled to such a defense to liability but entitled to such a limitation of liability, such claim may be asserted only as to removal costs incurred in excess of that limitation:

(2) under item 2 by any United States claimant, if the property involved is owned or leased by the claimant;

(3) under item (3), by the President, as trustee, for natural resources over which the United States Government has sovereign rights or natural resources within the territory or fishing conservation zone of the United States to the extent they are managed or protected by the United States, or by any State for natural resources within the boundary of that State belonging to, managed by, controlled by, or appertaining to the State: *Provided* That compensation paid under this item shall be used only for assessing the damages to and the restoration of the natural resources damaged or for acquisition of equivalent resources;

(4) under item 4 by any United States claimant;

(5) under items 1 through 4, by a foreign claimant to the same extent that a United States claimant may assert a claim if—

(A) the pollution occurred (i) in the internal waters or (ii) in or on the territorial sea or the immediately adjacent shoreline of a foreign country of which the claimant is a resident;

(B) the claimant is not otherwise compensated for his loss;

(C) the discharge was from a facility located adjacent to or within the navigable waters or from a vessel within the navigable waters or was discharged in connection with activities conducted under the Outer Continental Shelf Lands Act, as amended by the Act (43 U.S.C. 1331 et seq.) or the Deepwater Port Act of 1974, as amended by the Act (33 U.S.C. 1501 et seq.); and

(D) recovery is authorized by a treaty or an executive agreement between the United States and the foreign country involved, or if the Secretary of State, in consultation with the Attorney General and other appropriate officials, certifies that such country provides a comparable remedy for United States claimants: *Provided*, that subclauses (A), (C), and (D) of this clause shall not apply where the claim is asserted by a resident of Canada and where pollution involves oil discharged from a vessel carrying oil that has been (i) transported through the pipeline authorized by the Trans-Alaska Pipeline Authorization Act, as amended, (ii) loaded for transportation to a port under the jurisdiction of the United States, and (iii) discharged prior to being brought ashore in that port; and *Provided further*, That notwithstanding paragraph (1) of subsection (b) of section 6 of this Act, with respect to any oil pollution described in the foregoing proviso, any resident of Canada may assert a claim for all damages, including clean-up costs which would have been cognizable under subsection (c) of section 204 of the Trans-Alaska Pipeline Authorization Act;

(6) Under item 1, by a foreign owner or operator of a vessel to the same extent that a United States owner or operator of a vessel may assert such a claim under clause (1) of this subsection where the pollution involved is that set forth in clauses (1), (2), or (4) of subsection (bb) of section 601 of this title; and

(7) Under any item, by the Attorney General, on his own motion or at the request of the President, on behalf of any group of United States claimants who may assert a claim under this subsection, when he determines that the claimants would be more adequately represented as a class in asserting their claims. Failure of the Attorney General to take action shall have no bearing on any class action maintained by any claimant for damages authorized by this section.

(c) If the number of members of a class in an action brought under clause (7) of subsection (b) of this section exceeds one thousand, publication of notice of such action in local newspapers of general circulation in the areas in which the damaged persons reside shall be deemed to fulfill the requirement for public notice established by Rule 23(c)(2) of the Federal Rules of Civil Procedure.

(d)(1) The Administrator shall, within 12 months of the effective date of this title, establish by regulation a priority system for responding to releases or threats of releases from uncontrolled hazardous waste disposal sites which shall include, but not be limited to:

(A) methods, including the role of the States in determining State priorities for response, and in assisting in the Administrator's determination of national priorities for response, and criteria for determining response priorities in the development of which the Administrator shall, to the extent possible, take into account: the significance of the threat to public health, safety, and significant environmental resources; the population at risk, the hazard potential of the hazardous substances at such sites; the potential for contamination of drinking water supplies; the potential for direct human contact; the potential for destruction of sensitive ecosystems; State preparedness to assume State costs and responsibilities; and such other factors as he deems appropriate; and

(B) a system, including the use of contracts, whereby the State or States affected by a release of hazardous substances from such sites may act where necessary to provide emergency assistance and containment and may be reimbursed for the reasonable costs incurred for such assistance and containment from the fund.

(2) Claims for the costs of emergency assistance and containment carried out pursuant to subsection (b) of section 603 of this title may be asserted if the Administrator certifies that such costs have been incurred in a manner consistent with the regulations promulgated pursuant to paragraph (1) of this subsection—

(A) by any agency of the United States government;

(B) by any State, with respect to any reimbursements allowed by the said regulations; or

(C) by any person who is an owner or operator of an uncontrolled hazardous waste disposal site, or any other person who may be liable for a release from such site, for any such costs associated with a release occurring from that site: *Provided*, That the owner or operator of any uncontrolled hazardous waste disposal site, or any other person who would otherwise be liable under subsection (b) of section 604 of this title, may assert such a claim only if he can show that he is entitled to a defense to liability under subsection (d) of section 604 of this title, or, if not entitled to such a defense to liability, that he is entitled to a limitation of liability under subsection (c) of section 604 of this title: *Provided further*, That where he is not entitled to such a defense to liability but entitled to such a limitation of liability, such claim may be asserted only as to emergency assistance and containment costs incurred in excess of that limitation. *Further provided*, That nothing contained in this subsection shall be deemed or held to prevent the assertion of a claim by the Administrator for any emergency assistance or containment activity carried out or authorized by him prior to the promulgation of the regulations provided for herein.

DESIGNATION AND ADVERTISEMENT

SEC. 608. (a)(1) When the Executive receives information of an incident which involves pollution or when he exercises his authority to respond to a release of a hazardous substance from an uncontrolled hazardous waste disposal site, he shall, where possible, designate the source or sources of the pollution or release and shall immediately notify the owner, operator, and the guarantor of the source of that designation and, in the case of an uncontrolled hazardous waste disposal site, any other liable party, where possible.

(2) Any person designated under paragraph (1) of this subsection may deny that designation. If the owner, operator, or guarantor of a source of pollution fails to inform the Executive, within five days after receiving notification of the designation, of his denial, that owner, operator, or guarantor, as required by regulations promulgated by the Executive, shall advertise the designation and the procedures by which claims may be presented to him. If advertisement is not otherwise made in accordance with this paragraph, the Executive shall, as he finds necessary, and at the expense of the owner, operator, or guarantor involved, advertise the designation and the procedures by which claims may be presented to that owner, operator, or guarantor.

(b) In a case where—

(1) the owner, operator, and guarantor all deny a designation in accordance with paragraph (2) of subsection (a) of this section,

(2) the source of the pollution or release was a public vessel, or

(3) the Executive is unable to designate the source or sources of the pollution or release under paragraph (1) of subsection (a) of this section, he shall advertise or otherwise notify potential claimants of the procedures by which claims may be presented to the fund.

(c) Advertisement under subsection (a) of this section shall commence no later than fifteen days from the date of the designation made thereunder and continue for a period of no less than thirty days.

CLAIMS SETTLEMENT

SEC. 609. (a) Claims may be presented directly to the fund by any authorized agency of the United States Government for the costs described in clauses (A) through (D) of section 606(d)(1) of this title, and the Executive is authorized to promulgate regulations designating the Federal official or officials who may obligate available money in the fund for such purposes. Except as provided in subsection (b) of this section, all other claims shall be presented to the owner, operator, or guarantor.

(b) All claims shall be presented to the fund—

(1) where the Executive has advertised or otherwise notified claimants in accordance with subsection (b) of section 608 of this title, or

(2) by an owner, operator or other liable person where he may recover under the provisions of subsection (b)(1) or under subsection (d)(2) of section 607 of this title.

(c) In the case of a claim presented in accordance with subsection (a), and in which—

(1) the person to whom the claim is presented denies all liability for the claim, for any reason, or

(2) the claim is not settled by any person by payment to the claimant within 120 days of the date upon which (A) the claim was presented, or (B) advertising was commenced pursuant to paragraph (2) of subsection (a) of section 608 of this title, whichever is later, the claimant may elect to commence an action in any court of competent jurisdiction against the owner, operator, or guarantor, or to present the claim to the fund, that election to be irrevocable and exclusive. Should the Claimant elect to commence an action in court, the standards of liability, and the defenses and limitations thereto set forth in section 604 of this title shall apply, any other laws to the contrary notwithstanding.

(d) In the case of a claim presented in accordance with subsection (a) of this section, where full and adequate compensation is unavailable, either because the claim exceeds a limit of liability invoked under subsection (c) of section 604 of this title or because the owner, operator, and guarantor are financially incapable of meeting their obligations in full, a claim for the uncompensated damages may be presented to the fund.

(e) In the case of a claim which has been presented to any person, pursuant to subsection (a) of this section, and which is presented to the fund pursuant to subsection (c) or (d) of this section, such person, at the request of the claimant, shall transmit the claim and supporting documents to the fund. The Executive may, by regulation, prescribe the documents to be transmitted and the terms under which they are to be transmitted.

(f) In the case of a claim presented to the fund, pursuant to subsection (b), (c), or (d) of this section, and in which the fund—

(1) denies all liability for the claim, for any reason, or

(2) does not settle the claim by payment to the claimant within sixty days of the date upon which (A) the claim was presented to the fund or (B) advertising was commenced pursuant to subsection (c) of section 608 of this title, whichever is later, the claimant may submit the dispute to the Executive for decision in accordance with section 554 and related provisions of title 5, United States Code.

(g)(1) The Executive shall promulgate regulations which establish uniform procedures and standards for the appraisal and settlement of claims against the fund: *Provided*, That nothing contained in this section or the preceding section shall be construed as authorizing the Executive to deny any claim presented by any authorized agency of the United States Government for cleanup, removal, emergency assistance, or containment costs or costs incurred under section 603 (a)(1)(B) of this title. Should moneys for any such claim not be available in the fund, the Executive shall defer payment of the claim until moneys are available.

(2) Except as provided in paragraph (3) of this subsection, the Executive shall use the facilities and services of private insurance and claims adjusting organizations or State agencies in processing claims against the fund and may contract to pay compensation for those facilities and services. Any contract made under the provisions of this paragraph may be made without regard to the provisions of section 3709 of the Revised Statutes, as amended (41 U.S.C. 5), upon a showing by the Executive that advertising is not reasonably practicable. The Executive shall establish procedures for the approval and payment of claims. When the services of a State agency are used in processing and settling claims, no payment may be made on a claim asserted on behalf of that State or any of its agencies or subdivisions unless the payment has been approved by the Executive.

(3) To the extent necessitated by extraordinary circumstances, where the services of such private organizations or State agencies are inadequate, the Executive may use Federal personnel to process claims against the fund.

(h) Without regard to subsection (b) of section 556 of title 5, United States Code, the Executive is authorized to appoint, from time to time for a period not to exceed one hundred and eighty days, one or more panels, each comprised of three individuals, to hear and decide disputes submitted to the Executive pursuant to subsection (f). At least one member of each panel shall be qualified in the conduct of adjudicatory proceedings and shall preside over the activities of the panel. Each member of a panel shall possess competence in the evaluation and assessment of property damage and the economic losses resulting therefrom. Panel members may be appointed from private life or from any Federal agency except the staff administering the fund. Each panel member appointed from private life shall receive a per diem compensation, and each panel member shall receive necessary travel and other expenses while engaged in the work of a panel. The provisions of chapter 11 of title 18, United States Code, and of Executive Order 11222, as amended, regarding special government employees, apply to panel members appointed from private life.

(i) (1) Upon receipt of a request for decision from a claimant, properly made, the Executive shall refer the dispute to an administrative law judge, appointed under section 3105 of title 5, United States Code or a panel appointed under subsection (h) of this section.

(2) The administrative law judge and each member of a panel to which a dispute is referred for decision shall be a resident of the United States judicial circuit within which the damage complained of occurred, or, if the damage complained of occurred within two or more circuits, of any of the affected circuits, or, if the damage occurred outside any circuit, of the nearest circuit.

(3) Upon receipt of a dispute, the administrative law judge or panel shall adjudicate the case and render a decision in accordance with section 554 of title 5, United States Code. In any proceeding subject to this subsection, the presiding officer may require by subpoena any person to appear and testify or to appear and produce books, papers, documents, or tangible things at a hearing or deposition at any designated place. Subpoenas shall be issued and enforced in accordance with procedures in subsection (d) of section 555 of title 5, United States Code, and rules promulgated by the Executive. If a person fails or refuses to obey a subpoena, the Executive may invoke the aid of the district court of the United States where the person is found, resides, or transacts business in requiring the attendance and testimony of the person and the production by him of books, papers, documents, or any tangible things.

(4) A hearing conducted under this subsection shall be conducted within the United States judicial district within which, or nearest to which, the damage complained of occurred, or, if the damage complained of occurred within two or more districts, in any of the affected districts, or, if the damage occurred outside any district, of the nearest district.

(5) The decision of the administrative law judge or panel under this subsection shall be the final order of the Executive except that the Executive in his discretion and in accordance with rules which he may promulgate, may review the decision upon his own initiative or upon exception of the claimant or the fund.

(6) Final orders of the Executive made under this subsection shall not be subject to judicial review.

(j) (1) In any action brought against an owner, operator, or guarantor, both the plaintiff and defendant shall serve a copy of the complaint and all subsequent pleadings therein upon the fund at the same time those pleadings are served upon the opposing parties.

(2) The fund may intervene in the action as a matter of right.

(3) In any action to which the fund is a party, if the owner, operator, or guarantor admits liability under this title, the fund upon its motion shall be dismissed therefrom to the extent of the admitted liability.

(4) If the fund receives from either the plantiff or the defendant notice of such an action, the fund shall be bound by any judgment entered therein, whether or not the fund was a party to the action.

(5) If neither the plaintiff nor the defendant owner or operator gives notice of such an action to the fund, the limitation of liability otherwise permitted by subsection (c) of section 604 of this title is not

available to that defendant, and the plaintiff shall not recover from the fund any sums not paid by the defendant.

(k) In any action brought against the fund, the plaintiff may join the owner, operator, or guarantor, and the fund may implead any person who is or may be liable to the fund under any provisions of this title.

(l) No claim may be presented, nor may an action be commenced for damages recoverable under this title, unless that claim is presented to, or that action is commenced against, the owner, operator, or guarantor, or against the fund, as to their respective liabilities within three years from the date of discovery of the economic loss or cost for which a claim may be asserted under subsection (a) of section 607 of this title.

SUBROGATION

SEC. 610. (a) Any person or governmental entity, including the fund, who shall pay compensation to any claimant for an economic loss or cost, compensable under section 607 of this title, shall be subrogated to all rights, claims, and causes of action which that claimant has under this title.

(b) Upon request of the Executive, the Attorney General may commence an action, on behalf of the fund, for the compensation paid by the fund to any claimant pursuant to this title. Such an action may be commenced under any law against any owner, operator, or guarantor, or against any other person or governmental entity, who is liable thereunder to the compensated claimant or to the fund, for the damages for which the compensation was paid.

(c) In all claims or actions by the fund against any person pursuant to the provisions of subsections (a) and (b) of this section, the fund shall recover—

(1) for a claim presented to the fund (where there has been a denial of source designation) pursuant to section 608(b)(1) of this title, or (where there has been a denial of liability) pursuant to section 609(c)(1) of this title—

(A) subject only to the limitation of liability to which the defendant is entitled under subsection (c) of section 604 of this title, the amount the fund has paid to the claimant, without reduction;

(B) interest on that amount, at the rate calculated in accordance with section 604(h)(2) of this title, from the date upon which the claim was presented by the claimant to the defendant to the date upon which the fund was paid by the defendant, inclusive, less the period, if any, from the date upon which the fund shall offer to the claimant the amount finally paid by the fund to the claimant in satisfaction of the claim against the fund to the date upon which the claimant shall accept that offer, inclusive, and

(C) all costs incurred by the fund by reason of the claim, both of the claimant against the fund and the fund against the defendant, including, but not limited to, processing costs, investigating costs, court costs, and attorney's fees; and

(2) for a claim presented to the fund pursuant to section 609 (c)(2) of this title—

(A) in which the amount the fund has paid to the claimant exceeds the largest amount, if any, the defendant offered to the claimant in satisfaction of the claim of the claimant against the defendant—

(i) subject to dispute by the defendant as to any excess over the amount offered to the claimant by the defendant, the amount the fund has paid to the claimant;

(ii) interest, at the rate calculated in accordance with section 604(h)(2) of this title, for the period specified in clause (1) of the subsection; and promulgate, may review the decision upon his own initiative or upon exception of the claimant or the fund.

(iii) all costs incurred by the fund by reason of the claim of the fund against the defendant, including, but not limited to, processing costs, investigating costs, court costs, and attorney's fees; or

(B) in which the amount the fund has paid to the claimant is less than or equal to the largest amount the defendant offered to the claimant in satisfaction of the claim of the claimant against the defendant—

(i) the amount the fund has paid to the claimant, without reduction;

(ii) interest, at the rate calculated in accordance with section 604(h)(2) of this title, from the date upon which the claim was presented by the claimant to the defendant to the date upon which the defendant offered to the claimant the largest amount referred to in this subclause: *Provided*, That if the defendant tendered the offer of the largest amount referred to in this subclause within 120 days of the date upon which the claim of the claimant was either presented to the defendant or advertising was commenced pursuant to section 608 of this title, the defendant shall not be liable for interest for that period; and

(iii) interest from the date upon which the claim of the fund against the defendant was presented to the defendant to the date upon which the fund is paid, inclusive, less the period, if any, from the date upon which the defendant shall offer to the fund the amount finally paid to the fund in satisfaction of the claim of the fund to the date upon which the fund shall accept that offer, inclusive.

(d) The fund shall pay over to the claimant that portion of any interest the fund shall recover, pursuant to subsections (c)(1) and (c)(2)(A) of this section, for the period from the date upon which the claim of the claimant was presented to the defendant to the date upon which the claimant was paid by the fund, inclusive, less the period from the date upon which the fund offered to the claimant the amount finally paid to the claimant in satisfaction of the claim to the date upon which the claimant shall accept that offer, inclusive.

(e) The fund is entitled to recover for all interest and costs specified in subsection (c) of this section without regard to any limitation of liability to which the defendant may otherwise be entitled.

JURISDICTION AND VENUE

SEC. 611. (a)(1) Except as provided in paragraph (2) of this subsection, the United States district courts shall have exclusive original jurisdiction over all controversies arising under this title, without regard to the citizenship of the parties or the amount in controversy.

(2) Review of any regulation issued under this title may be had upon application of an interested person only in the Circuit Court of Appeals of the United States for the District of Columbia. Any such application for review must be made within ninety days from the effective date of the regulation.

(b) For the purposes of paragraph (1) of subsection (a) of this section, venue shall lie in any district wherein the injury complained of occurred, or wherein the defendant resides, may be found, or has his principal office. For the purposes of this section, the fund shall reside in the District of Columbia.

(c) The provisions of subsection (a) and (b) of this section shall not apply to any controversy or other matter resulting from the assessment of collection of any fee, as provided by section 606(f) of this title, or to the review of any regulation promulgated under the Internal Revenue Code of 1954.

RELATIONSHIP TO OTHER LAW

SEC. 612. (a) Except as provided in this title—

(1) No action may be brought in any court of the United States, or of any State or political subdivision thereof, for damages for an economic loss or cost described in subsection (a) of section 607 of this title, a claim for which may be asserted under this title, and

(2) no person may be required to contribute to any fund, the purpose of which is to pay compensation for such a loss or cost, nor to establish or maintain evidence of financial responsibility relating to the satisfaction of a claim for such a loss or cost.

(b) Nothing in subsection (a) of this section shall preclude or be interpreted to preempt any State from establishing liability funds, establishing limits of liability, setting financial responsibility requirements, or imposing any taxes or fees upon any person, or upon oil or hazardous substances for the purpose of establishing liability and compensation schemes for losses or costs not compensated under this title which are associated with pollution, or for any losses or costs associated with releases of hazardous substances as defined in section 601 (o)(3) at uncontrolled hazardous waste disposal sites.

(c) Nothing in subsection (a) of this section shall prohibit an action by the fund, under any other provision of law, to recover compensation paid pursuant to this title.

(d) Regardless of any State statutory or common law to the contrary, no person who asserts a claim for damages pursuant to this title shall be deemed or held to have waived any other claim for damages not covered or assertable under this title arising from the same incident, transaction, or set of circumstances, nor to have split a cause of action. Further, no person asserting a claim pursuant to this title shall as a result of any determination of a question of fact or law made in connection with that claim be deemed or held to be collaterally estopped from raising such question in connection with any other claim not covered or assertable under this title arising from the same incident, transaction, or set of circumstances.

(e) In the case of conflict or inconsistency, the provisions of this Act shall supersede all other provisions of Federal law which may define liability for the release of oil or hazardous substances, provide a mechanism for responding to such releases, set up a claim mechanism relating to losses resulting from such releases, or otherwise regulate or control the release or threat of release of oil or hazardous substances. *Provided*, That this title does not preempt the authority of the Federal Government to take action under other provisions of Federal law for any remedies not provided by this title.

AUTHORITY TO DELEGATE, ISSUE REGULATIONS

SEC. 613. The President is authorized to delegate and assign any duties or powers imposed upon him or assigned to the Executive, and, except to the extent limited by section 606(f) of this title, to promulgate any regulations necessary to carry out the provisions of this title.

REPORTS, STUDIES, REVIEW OF FEES AND PENALTIES

SEC. 614. (a) The Executive shall submit to the Congress within six months after the end of each fiscal year, beginning one year after the establishment of the fund pursuant to section 606 of this title, a report summarizing the receipts and disbursements made from the fund during that year, showing categories of sources and types of damages reimbursed. The report shall also describe the administration and functioning of the fund during the period covered and present any recommendations the Executive may have for improvement.

(b) No more than three years after the effective date of this title, the Executive shall make a comprehensive report to the Congress on experience with the implementation of this title, including, but not limited to, an analysis of: (1) whether the prohibitions against releases are effective; (2) the extent to which the fund is effective in enabling government to respond to and mitigate the effects of releases and threatened releases of oil and hazardous substances; (3) the cost of responding to and the potential threat to public health or safety, or to significant environmental resources, posed by remaining uncontrolled hazardous waste disposal sites; (4) whether the fees, appropriations, and penalties established hereunder are sufficient and equitable; and (5) State participation in the system of response, liability, and compensation established by this title. In preparing such report, the Executive shall consult with appropriate Federal, State, and local agencies, affected industries and claimants and other interested parties. Based upon the analyses and consultation required by this subsection, the Executive shall also include in the report any recommendations for legislative changes he may deem necessary for the better effectuation of the purposes of this title, including but not limited to recommendations concerning authorization levels, fees, States participation, liability and liability limits, and financial responsibility provisions.

EFFECTIVE DATES, SAVINGS PROVISION

SEC. 5. (a) This section, section 7 and all provisions of this Act authorizing the appropriation of funds, the delegation of authority, and the promulgation of regulations shall be effective on the date of enactment of this Act.

(b) All other provisions of this Act and the regulations applicable thereto shall be effective on the first day of the first calendar month beginning on or after the one hundred and eightieth day after the date of enactment of this Act; *Provided*, That any regulations issued pursuant to this title may provide for such an additional period in which to comply or for such an effective date as the Executive may determine is reasonable.

(c) Any regulation issued pursuant to any provision of section 311 of the Federal Water Pollution Control Act, as amended, which is in effect on the date immediately preceding the effective date of section 6 of this Act shall be deemed to be a regulation issued pursuant to the authority of Title VI of section 4 of this Act and shall remain in full force and effect unless or until superseded by new regulations issued thereunder.

(d) Any regulation—

(1) respecting financial responsibility,

(2) issued pursuant to any provision of law repealed by section 6 of this Act, and

(3) in effect on the date immediately preceding the effective date of section 6 of this Act shall be deemed to be a regulation issued pursuant to the authority of Title VI of section 4 of this Act and shall remain in full force and effect unless or until superseded by new regulations issued thereunder.

(e) No provision of this Act shall be deemed or held to moot any litigation concerning releases of oil or hazardous substances commenced prior to the effective date of this Act.

CONFORMING AMENDMENTS

SEC. 6. (a) Subsection (b) of section 204 of the Trans-Alaska Pipeline Authorization Act (87 Stat. 586) is amended, in the first sentence, by inserting after "any area", the words "in the State of Alaska"; by inserting after "any activities", the words "related to the trans-Alaska oil pipeline", and by inserting at the end of the subsection a new sentence to read as follows: "this subsection shall not apply to removal costs resulting from pollution as that term is defined in subsection (ff) of section 601 of the Oil, Hazardous Substances, and Hazardous Wastes Response, Liability, and Compensation Act of 1979.".

(b) Subsection (c) of section 204 of the Trans-Alaska Pipeline Authorization Act is hereby repealed. The Trans-Alaska Pipeline Liability Fund is hereby abolished. All assets of that fund, as of the effective date of this section, shall be transferred to the fund established by section 606 of Title VI, as set out in section 4 of this Act. The fund shall assume any and all liability incurred by the Trans-Alaska Pipeline Liability Fund under the terms of subsection (c) of section 204 of the Trans-Alaska Pipeline Authorization Act.

(c) Section 17 of the Intervention of the High Seas Act (88 Stat. 10) is amended to read as follows:

> SEC. 17. The fund established under section 606 of the Oil, Hazardous Substances, and Hazardous Wastes Response, Liability, and Compensation Act of 1979 shall be available to the Secretary for actions and activities taken under section 5 of this Act.

(d) Section 311 of the Federal Water Pollution Control Act, as amended, is hereby repealed. The fund established pursuant to subsection (k) of that section is hereby abolished, and any and all assets of that fund, as of the effective date of this section, shall be transferred to the fund established by section 606 of Title VI, as set out in section 4 of this Act.

(e) The Deepwater Port Act of 1974 (88 Stat. 2126) is amended as follows:

(1) In section 4(c)(1), strike "section 18(l) of this Act," and insert in lieu thereof "section 605 of the Oil, Hazardous Substances, Hazardous Wastes Response, Liability, and Compensation Act of 1979.".

(2) Subsections (b), (d), (e), (f), (g), (h), (i), (j), (l), and (n) of section 18 are deleted.

(3) Clause (3) of subsection (c) of section 18 is amended by striking "Deepwater Port Liability Fund established pursuant to subsection (f) of this section." and inserting in lieu thereof "fund established under section 606 of the Oil, Hazardous Substances, and Hazardous Wastes Response, Liability, and Compensation Act of 1979.".

(4) Subsection (k) of section 18 is amended to read as follows:

> "(k) This section shall not be interpreted to preclude any State from imposing additional requirements, not inconsistent with the provisions of the Oil, Hazardous Substances, and Hazardous Wastes Response, Liability, and Compensation Act of 1979, for any discharge of oil from a deepwater port or a vessel within any safety zone.".

(5) Subsections (c), (k), and (m) of section 18 are redesignated (b), (c), and (d), respectively.

(f) Title III of the Outer Continental Shelf Lands Act Amendments of 1978 is repealed. Any fees or moneys deposited in the Offshore Oil Pollution Compensation Fund established under Section 302 of that title shall be deposited in the fund established by section 606 of Title VI, as set out in section 4 of this Act. The fund shall assume any and all liability incurred by the Offshore Oil Pollution Compensation Fund under title III of the Outer Continental Shelf Lands Act Amendments of 1978.

(g) Subsection (b) of section 504 of the Federal Water Pollution Control Act, as amended, is hereby repealed.

SEPARABILITY

SEC. 7. If any provision of this Act, or the application of any provision of this Act to any person or circumstance, is held invalid, the application of such provision to other persons or circumstances, and the remainder of this Act shall not be affected thereby.

96th Congress, 1st Session - - - - - - - - - - - - - - - - - - House Document 96-150

EXAMINATION OF FINANCIAL STATEMENTS
INTER-AMERICAN FOUNDATION
FISCAL YEARS 1977 AND 1978

COMMUNICATION

FROM

THE COMPTROLLER GENERAL OF THE UNITED STATES

TRANSMITTING

A REPORT ON THE EXAMINATION OF FINANCIAL STATEMENTS OF THE INTER-AMERICAN FOUNDATION FOR FISCAL YEARS 1977 AND 1978, PURSUANT TO SECTION 401(t) OF PUBLIC LAW 91-175, AS AMENDED

JUNE 15, 1979.—Referred to the Committees on Government Operations, and Foreign Affairs and ordered to be printed

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U.S. GOVERNMENT PRINTING OFFICE
47-080 O WASHINGTON : 1979

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BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Examination Of Financial Statements Of The Inter-American Foundation For Fiscal Years Ended September 30, 1978 And 1977

1824

GAO examined the statement of financial condition of the Inter-American Foundation, a U.S. Government corporation, as of September 30, 1978 and 1977, and the related statements of investment of the U.S. Government, grant disbursements and administrative expenses, and changes in financial position for the fiscal years then ended, pursuant to the Government Corporation Control Act.

In GAO's opinion the accompanying financial statements present fairly the financial position of the Foundation as of the dates specified above, the results of its operations and the changes in its financial position for the years then ended, in conformity with generally accepted accounting principles.

The Foundation was established under the Foreign Assistance Act to provide support for development activities designed to achieve improved conditions for Latin Americans and Caribbeans. Until 1972, the Foundation operated under the name of Inter-American Social Development Institute. The name was changed pursuant to Public Law 92-226(406(2)).

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JUNE 14, 1979

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-135075

The Honorable Thomas P. O'Neill, Jr.
Speaker of the House of Representatives

Dear Mr. Speaker:

Our report on the examination of the financial statements of the Inter-American Foundation for fiscal years 1978 and 1977, as required by the Government Corporation Control Act (31 U.S.C. 841 et seq.), is enclosed.

This report also is being sent today to the President of the Senate. Copies of the report are being sent to the Director, Office of Management and Budget; the Secretary of the Treasury; and the President and Chairman of the Board of Directors, Inter-American Foundation.

Sincerely yours,

Elmer B. Staats

Comptroller General
of the United States

Enclosure

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-135075

MAY 18, 1979

To the Board of Directors
Inter-American Foundation

We have examined the statement of financial condition of the Inter-American Foundation as of September 30, 1978, and 1977, and the related statements of investment of the U.S. Government, grant disbursements and administrative expenses, and changes in financial position for the fiscal years then ended. This examination was made pursuant to the Government Corporation Control Act (31 U.S.C. 841 et seq.) in accordance with generally accepted auditing standards, and included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion the accompanying financial statements present fairly the financial position of the Inter-American Foundation at September 30, 1978, and September 30, 1977, and the results of its operations and the changes in its financial position for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis after giving retroactive effect to the change, with which we concur, in accounting for the Social Program Trust Fund as described in note 1c to the financial statements.

Sincerely yours,

Elmer B. Staats

Comptroller General
of the United States

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INTER-AMERICAN FOUNDATION
COMPARATIVE STATEMENT OF FINANCIAL CONDITION
AT SEPTEMBER 30, 1978 and 1977

ASSETS

	1978		1977	
Funds with U.S. Treasury (note 2)	$9,497,670		$16,009,089	
Undeposited Collections	35,333		-	
Cashier imprest fund	2,280		1,587	
Total cash		$ 9,535,283		$16,010,676
Due from Social Progress Trust Fund (note 3)		40,156,680		48,940,928
Accounts receivable		12,225		322,582
Employee travel advance		7,383		17,145
Office furniture and equipment	122,269		79,721	
Less allowance for depreciation	63,580	58,689	51,348	28,373
Total assets		$49,770,260		$65,319,704

The notes on pages 6 to 8 are an integral part of the financial statements.

SCHEDULE 1 SCHEDULE 1

LIABILITIES, DEFERRED FUNDS, AND INVESTMENT OF U.S. GOVERNMENT

	1978		1977	
LIABILITIES				
Accounts payable				
Trade and approved grant disbursement requests	$196,953		$ 99,883	
Owed to U.S. Government agencies	32,280		18,459	
Accrued annual leave	92,092		96,706	
Accrued salaries and benefits	112,044		88,717	
Cashier funds advanced by Treasury	3,000		3,000	
Total liabilities		$ 436,369		$ 306,765
Obligations (note 4)				
DEFERRED SOCIAL PROGRESS TRUST FUND (notes 1c and 3)		40,156,680		48,940,928
INVESTMENT OF U.S. GOVERNMENT (Schedule 2)		9,177,211		16,072,011
Total liabilities, deferred funds, and investment		$49,770,260		$65,319,704

The notes on pages 6 to 8 are an integral part of the financial statements.

SCHEDULE 2

SCHEDULE 2

INTER-AMERICAN FOUNDATION
COMPARATIVE STATEMENT OF CHANGES IN THE INVESTMENT OF U.S. GOVERNMENT
FOR THE FISCAL YEARS ENDED SEPTEMBER 30, 1978 and 1977

	1978		1977	
	Appropriated Funds	Social Progress Trust Fund	Appropriated Funds	Social Progress Trust Fund
Initial Investment	$50,000,000	$31,000,000	$50,000,000	$31,000,000
Add: Donations	465	-	465	-
Additional investment	-	48,000,000	-	48,000,000
	50,000,465	79,000,000	50,000,465	79,000,000
Less: Lapse of unobligated and deobligated funds				
Prior Years	-	5,093,662	-	-
Current Year	-	57,440	-	5,093,662
Net available funds	50,000,465	73,848,898	50,000,465	73,906,338
Less: Disbursements and expenses				
Prior Years	33,928,454	24,965,410	28,793,571	14,635,459
Current Year	6,894,800	8,726,808	5,134,883	10,329,951
Total	40,823,254	33,692,218	33,928,454	24,965,410
Deferral of unexpended portion of Social Progress Trust Fund	-	40,156,680	-	48,940,928
Investment of U.S. Government	$ 9,177,211	-	$16,072,011	-

The notes on pages 6 to 8 are an integral part of the financial statements.

SCHEDULE 3

SCHEDULE 3

INTER-AMERICAN FOUNDATION
COMPARATIVE STATEMENT OF GRANT DISBURSEMENTS AND ADMINISTRATIVE EXPENSES
FOR THE FISCAL YEARS ENDED SEPTEMBER 30, 1978 and 1977

	1978		1977	
SOCIAL PROGRESS TRUST FUND:				
Grant funds provided (notes 1c and 3)	$8,726,808		$10,329,951	
Less:				
Grant disbursements	8,726,808	-	10,329,951	-
OPERATING FUND APPROPRIATION:				
Grant disbursements		$4,394,247		$2,946,958
Administrative expenses:				
Employee salaries and benefits	1,581,886		1,495,326	
Employee travel and transporation	236,750		232,899	
Depreciation	12,231		13,884	
Office and equipment rental	138,400		144,436	
Telephone, postage and supplies	129,635		104,883	
Contracted services and other expenses	388,398		196,497	
Exchange rate adjustment for accounts receivable	13,253		-	
Total administrative expenses		2,500,553		2,187,925
Total disbursements and expenses financed with appropriated funds		$6,894,800		$5,134,883

The notes on pages 6 to 8 are an integral part of the financial statements.

SCHEDULE 4

SCHEDULE 4

INTER-AMERICAN FOUNDATION
COMPARATIVE STATEMENT OF CHANGES IN FINANCIAL POSITION FOR THE FISCAL YEAR ENDED SEPTEMBER 30, 1978 and 1977

	1978	1977
Funds Provided:		
Decrease in funds due from Social Progress Trust Fund	$ 8,784,248	$15,423,613
Less lapse of unobligated and deobligated funds	(57,440)	(5,093,662)
	8,726,808	10,329,951
Items not decreasing cash: Depreciation and loss on disposal of equipment	12,232	14,505
Decrease in accounts receivable and travel advances	320,119	-
Increase in liabilities	129,604	-
Donations	-	300
Total funds provided	$ 9,188,763	$10,344,756
Funds Applied:		
Grant disbursements and administrative expenses:		
Social Progress Trust Fund	$ 8,726,808	$10,329,951
Appropriated Funds	6,894,800	5,134,883
	15,621,608	15,464,834
Purchase of fixed assets	42,548	-
Increase in accounts receivable and travel advances	-	313,024
Decrease in liabilities	-	92,170
Total funds applied	$15,664,156	$15,870,028
Decrease in Cash	$ 6,475,393	$ 5,525,272
Change in Cash Balance:		
Cash balance, end of year	$ 9,535,283	$16,010,676
Cash balance, beginning of year	16,010,676	21,535,948
Decrease in Cash	$ 6,475,393	$ 5,525,272

The notes on pages 6 to 8 are an integral part of the financial statements.

NOTES TO FINANCIAL STATEMENTS

1. The Inter-American Foundation, a U.S. Government corporation, was established pursuant to part IV of the Foreign Assistance Act of 1969 (22 U.S.C. 290f). Its purpose is to provide support for developmental activities designed to achieve improved conditions for Latin Americans and the Caribbeans. Until February 1972, the Foundation operated under the name of Inter-American Social Development Institute. The name was changed pursuant to Public Law 92-226 (406(2)).

   Significant accounting policies:

   a. Foundation accounting records are maintained on an accrual basis.

   b. Depreciation is computed on the straight-line method based on the useful life of the assets. Depreciation is not charged in the year of acquisition, and a full year's depreciation is charged in the year of disposal. In fiscal year 1976, the Foundation adopted a new furniture and equipment capitalization policy, under which furniture and equipment acquired at a unit cost less than $300 is charged to operating expense.

   c. In fiscal year 1978, the Foundation adopted a change in its financial statement presentation to show the unexpended portion of the Social Progress Trust Fund as a deferred credit on the statement of financial condition, and an amount equal to the current year's expended portion as grant funds provided on the statement of grant disbursements and administrative expenses. The retroactive effect of these changes also is shown in the financial statements.

2. Enabling legislation authorized a transfer of $50,000,000 to the Foundation to remain available for Foundation use until expended; however, Congress established annual obligation limitations on this authority. The Congressional limitation on appropriated funds was $7,000,000 for fiscal year 1977 and $7,062,000 for fiscal year 1978.

3. Section 36 of the Foreign Assistance Act of 1973 provided for the periodic transfer of unencumbered capital resources of the Social Progress Trust Fund, and of any future repayments or other accruals otherwise payable to such trust fund, to the Inter-American Foundation for use in its program. Such resources and future repayments consist of foreign currencies of Latin American countries. The Social Progress Trust Fund, which is owned by the U.S., is administered for the U.S. by the Inter-American Development Bank. The Congress intended that the Bank would transfer a substantial and gradually increasing proportion of the trust funds to the Foundation, and that the Office of Management and Budget would coordinate the use of funds to be transferred.

   Implementation of this Congressional mandate first occurred with the signing of an agreement dated December 20, 1973, between the Foundation and the Bank. The agreement initially provided that the Bank would make available to the Foundation over a period of 3 years $30 million in such foreign currencies as might be required by the Foundation to carry out its purposes. In August 1974, this amount was increased to $31 million. Of this amount $25,906,338 were obligated and $5,093,662 lapsed during fiscal year 1977. An additional $57,440 of unused funds obligated under the 1973 agreement lapsed and were de-obligated in fiscal year 1978. As a result, the Bank's commitment to make funds available from resources allocated during the initial 3-year period was reduced by the amount of these fund lapses.

In March 1976, the agreement was amended to provide an additional $48 million in foreign currencies over the next 3-year period. These funds have been made available to finance social development projects operated by Foundation designated entities in the member countries of the Bank.

The status of these funds as of the end of its 1978 and 1977 fiscal years is summarized below:

	9/30/78	9/30/77
Total amounts agreed to be made available	$79,000,000	$79,000,000
Less: Adjustment for loss of funds which were not obligated during first 3-year period as provided under agreement.	5,093,662	5,093,662
De-obligation of unused 1973 to 1976 program funds.	57,440	-
	5,151,102	5,093,662
Net available	73,848,898	73,906,338
Cumulative disbursements for projects	33,692,218	24,965,410
Remaining interest in Fund assets	40,156,680	48,940,928
Undisbursed obligations	10,217,566	10,504,404
Available for future obligations	$29,939,114	$38,436,524

4. At September 30, 1978, and September 30, 1977, Foundation undisbursed obligations were:

Appropriated funds	$ 4,371,403	$ 5,203,914
Social Progress Trust Fund	10,217,566	10,504,404
Total undisbursed obligations	$14,588,969	$15,708,318

INTER-AMERICAN FOUNDATION
BOARD OF DIRECTORS
AS OF SEPTEMBER 30, 1978

	Appointed
Peter T. Jones, Chairman	May 24, 1978
Charles A. Meyer, Vice Chairman	Apr. 25,1974
Alberto Ibarguen	May 24, 1978
Arnold Nachmanoff	May 24, 1978
Carolyn R. Payton	May 24, 1978
Manuel R. Caldera	Sept. 30, 1976
Viron P. Vaky	Jul. 14, 1978

PRINCIPAL OFFICIALS
AS OF SEPTEMBER 30, 1978

William M. Dyal, Jr., President	Mar. 15, 1971
Leon M. Parker, Executive Officer	May 16, 1971
Lawrence E. Bruce, Jr., General Counsel	Feb. 13, 1978